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MILITARY UTILIZATION OF A SAMPLE OF GRADUATE SCIENTISTS AND ENGINEERS 1968-1971

U. S. Army

Research Institute for the Behavioral and Social Sciences

January 1974

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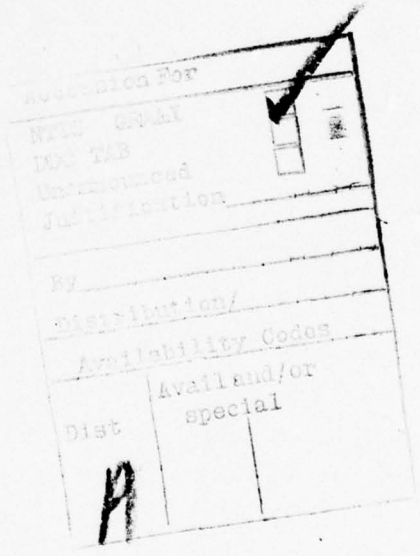

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(6) MILITARY UTILIZATION OF A SAMPLE OF GRADUATE SCIENTISTS AND ENGINEERS 1968-1971

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PREFACE

Between 1967 and 1972, the Scientific Manpower Commission (SMC) cooperated in a pilot program with the Office of the Assistant Secretary of Defense for Manpower and Reserve Affairs. This program was an effort to aid in the placement of college graduate draftees, particularly in the sciences and engineering, in appropriate military occupational specialties that would better utilize their civilian knowledge and skills. The contribution of the U. S. Army Research Institute for the Behavioral and Social Sciences was limited to support for the final phases of the study and the production of the report.

Most of this report is based on the results of a final SMC questionnaire sent out in 1973 and completed and returned by 621 men. This sample was the result of a steady attrition of the 3,000 men who responded to a short news item in Science magazine in June 1967 inviting science graduates about to be inducted into the Army to contact SMC concerning placement assistance in the Army. Many of the 3,000 respondents did not enter the Army, others failed to respond to SMC follow-up requests for location and duty assignments, and some did not respond to the final questionnaire. The report also includes an analysis of comments written by many of the men in the sample, particularly those assigned to science and engineering jobs.

The questionnaire used for the final follow-up study was designed to provide compatibility with information compiled by the Army after World War II--Scientists in Uniform--World War II. Comparisons were made of the utilization of the SMC sample of draftees, of whom more than half had completed at least one year of graduate training, with the beginning utilization patterns found in the Department of Defense study Statistics on the Utilization of Enlisted College Graduates in the Department of Defense, a study of 52,000 enlisted college graduates in all fields and all branches of service during 1969. The conclusions drawn from the SMC study, particularly when added to the Army and DoD studies, will be of value in any plan for future manpower mobilization.

MILITARY UTILIZATION OF A SAMPLE OF GRADUATE SCIENTISTS AND ENGINEERS - 1968-1971

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MILITARY UTILIZATION OF A SAMPLE OF GRADUATE SCIENTISTS AND ENGINEERS

1968-1971

BACKGROUND

When the Scientific Manpower Commission (SMC) was founded in 1953 toward the end of U. S. involvement in Korea, one of its functions was to serve as liaison between those scientists and engineers who were subject to the military draft, their educational institutions and employers, and the Selective Service System. Student deferments had been in effect since 1951, with the criteria tightened or liberalized as military manpower requirements rose or fell. Occupational deferments, in one form or another, had been available throughout the history of the United States, and were available during the Korean engagement to those men whose employers were able to prove their essentiality in their present jobs to the national health, safety or interest. However, criteria for "essentiality" were differently applied by the more than 4,000 local boards and by the various state appeal boards, and SMC was allowed to use its good offices to serve as an intermediary between employers who had been unable to obtain deferments for essential employees and the National Headquarters of Selective Service.

Military requirements for manpower obtained through the draft were small from July 1953 when the Korean armistice was signed until the buildup for Vietnam began in mid 1965. Thus, deferments were easily available for all students and for almost all scientific and technical occupations. However, by 1966, when draft calls for the year reached 365,000, draft boards had tightened their application of criteria for both occupational and student deferment, not only in response to higher calls but also to growing national opposition to deferments of any kind. Students were accused of "piling deferment on deferment" as they moved from student status to fatherhood, thus escaping liability to the draft. As of June 30, 1967, the Selective Service System eliminated deferment for new fathers who had been deferred as students.

Next to go, in 1968, were deferments for graduate study (except in medicine) which had been allowed since 1951 for those students who maintained steady progress, completed their degrees on time, and (during some of the war-time years) exhibited their abilities to score high on a national test or to maintain ranking in the top portion of their class.

Students who were already past their first year in graduate school by the fall of 1968 were allowed to continue to the next degree, while those who were first year graduate students and were in school by the time an induction notice arrived were allowed to postpone their induction to the end of the school year. In subsequent years, any student ordered for induction during the school year was allowed to complete his

current semester or term.

This new Selective Service policy produced a wave of college graduates and graduate students liable to induction in 1968 and 1969, and a steady flow through 1970 and 1971. Additionally, although eligibility rules for occupational deferments did not change until 1970, many local and state boards assumed new attitudes in regard to these deferments as early as 1968, often stating their feeling that a man's obligation to serve his country could not be fulfilled by any service in a civilian capacity. By Presidential directive, no new occupational deferments were granted after April 23, 1970. While men who held such deferments could renew them at the option of their draft boards so long as they continued in the same employment, many failed to obtain renewals. For this reason, a substantial number of men nearing age 26 lost the occupational deferments they had held for several years and were ordered for induction.

In the past, college trained men who entered service usually obtained officer commissions through ROTC or in limited numbers through OCS programs. However, the fairly abrupt ending of graduate deferments and then of occupational deferments made available large numbers of college graduates over a fairly short period of time. Under the draft rules of 1968 and 1969, which called oldest available men first, new college graduates and graduate students not eligible to continue their studies were ordered for induction in such large numbers that the Army needed very few of them as officers.

Beginning in January 1970, a lottery system for selection by random ordering of birthdates was put into effect, which was designed to call men principally between the ages of 19 and 20. However, in order to make the transition from an oldest-first selection system to the new lottery system, transitional rules were established to provide for the induction of relative proportions of both older and younger men. This was further modified in September of 1970 to provide for an "Extended Priority Selection Group" which consisted of persons who had not been available (generally because of deferment) when others of the same birthdate were inducted, and who would be the first group to be called in the year they became available.

The final transition provision occurred in September 1971 when Congress passed the Selective Service Act of 1971 which allowed undergraduate students enrolled in the 1970-71 school year to continue deferment to graduation, but allowed the President to prohibit student deferment to all who enrolled after that date. He exercised this authority at once.

Thus, in future years if the draft needs to be reinstated, and selection now in effect remains unchanged, the Army will not be sent large numbers of college graduates to fill its enlisted needs, as occurred in the 1968-70 period. During 1969 alone, 41,974 enlisted college graduates completed recruit training in the Army while an additional

2,718 enlisted in the Navy, 1,363 in the Marine Corps and 6,073 in the Air Force.[1]

No Military Occupation Specialties for enlisted men in any of the services require a college degree. It was therefore inevitable that the military services would be unable to utilize the specialized training of most of these college graduates. However, there are some Military Occupational Specialty groups that can be matched against particular college majors for considerable overlap. This is particularly true in the technological areas of science and engineering, and in applications of mathematics such as computer work.

The Scientific Manpower Commission had been working with a number of young scientists and engineers who had tried unsuccessfully to obtain or renew occupational deferments, and some of these men entered the service as inductees early in 1968. One such young man with a degree in economics had been working under an occupational deferment as a GS-11 for the Maritime Administration. He lost his deferment and was inducted in April 1968. At the end of basic training, he was assigned as a truck driver and wrote back to the Scientific Manpower Commission to see if we could be of any assistance in changing his Military Occupation Specialty (MOS). He reported additionally what had happened to the other five college graduates in his basic training company - a civil engineer, a master's degree accountant, a geologist and two bachelor's in business administration. None of their assignments utilized these men's college training.

A phone call was made to the Office of Manpower and Reserve Affairs at the Pentagon to ask whether any change in assignment could be brought about for these men both to give the Army better use of its highly trained manpower and to give to the men a more challenging assignment. Investigation by that office resulted in some changes in assignment. The civil engineer and the geologist were placed in the Science and Engineering Aide program. One business administration major entered the regular Army in an assignment of his own request and the other was offered an opportunity to attend OCS. The accountant was moved into an accounting assignment.

Other letters followed from unhappy draftees, and an informal arrangement was worked out between the Scientific Manpower Commission and Mr. Keene Peterson of the Office of Manpower and Reserve Affairs in the Office of the Assistant Secretary of Defense by which SMC would call to the Army's attention the qualifications of particular science and engineering graduates who were being inducted. A small notice in a

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[1] Statistics on the Utilization of Enlisted College Graduates in the Department of Defense - Enlisted College Graduate Assignments from Recruit Training to DoD Occupational Specialties During Calendar Year 1969. Unpublished paper by the Office of the Assistant Secretary of Defense (Manpower and Reserve Affairs), Department of Defense, Washington, D. C. June, 1970. Table I.

June 1968 issue of SCIENCE suggested that college graduates and graduate students about to be drafted might wish to contact the Scientific Manpower Commission before induction both for advice and for possible help. From there, the word spread principally through university graduate schools and science departments, and through industrial employers. A form was prepared (Appendix A-1) which provided to the Commission basic information about the educational and occupational background of each individual. Transcripts were provided to the Commission by most of the inductees, and information about the Science and Engineering Aide Program was sent to the scientists and engineers entering the service (Appendix A-2).

When the basic training address and the date of completion of basic training were known by SMC, these forms were copied and forwarded to Mr. Keene Peterson at the Pentagon. He notified those responsible for the assignment of enlisted men completing basic training of the particular qualifications of each man and the date he would be available.

While all the men were requested to notify the Scientific Manpower Commission when their first assignment after basic was known, some did and some did not. Occasional follow-up mailings were made to learn this information, but not all of them reached the addressee.

When the first assignment after basic was totally unrelated to the man's civilian skills and experience, a further effort was made in the case of men with graduate training to effect a better utilization of civilian-acquired skills. Sometimes changes in MOS resulted, and sometimes no change was made.

The Army applied a number of criteria to the assignment process, and some of them were conflicting. First, of course, the needs of the Army at the time any particular man completed basic training were paramount. The Army also had a long-standing program of attracting qualified men by offering enlistment options which guarantee training within a job (MOS) or job family in return for a three year enlistment. This program was designed to encourage the enlistment of men who might decide to stay in the Army after their initial enlistment was completed, as well as to stimulate 3 and 4 year enlistments, since draftees served only two years. Thus, the Army continued to offer guaranteed training to longer-term enlistees in many areas where it was obtaining through induction men already trained. This commonly resulted in drafting a trained engineer and placing him in a combat infantry MOS while a volunteer without technical training was placed in a military service school where he would learn some particular engineering function for a MOS he had been guaranteed for his three year enlistment. Completion of such training programs of course used up some of the additional time period of the enlistment, along with the time of the instructors, but also retained a valuable enlistment incentive.

A third factor operating in the assignment picture was not unique to the military services. It was the justifiable sociological effort to equate treatment of men from all backgrounds. The Army tried to see

that jobs in the combat infantry were spread across all groups, classes and races, so that no particular identifiable group of men had to carry the burden of combat to the exclusion of those who were better educated, who were from a higher socio-economic background, or who were of a particular ethnic stock.

Finally, the Army was concerned with using previously acquired skills among its men, and did make an effort during the interview process before basic training began not only to test men for intelligence and aptitude, but also to consider their previous training and their own wishes in regard to assignments. Given the limitations of these multiple requirements, it is not surprising that draftees, who had no assignment commitments from the Army, were the group least likely to obtain the assignment of their choice.

From the viewpoint of acquired skill utilization, these conflicting requirements sometimes produced wasteful results. For example, during fiscal year 1969 the Army needed 103 enlisted men in the area of soil science. During that same period, 244 graduates in soil science were inducted as enlisted men. Only six of them were assigned to the direct correlation MOS while 124 were assigned to the combat arms, and 120 to some other unrelated MOS. [2] Among the 1,780 engineers drafted as enlisted men in 1969, 49.9% were assigned to the combat infantry and allied specialties, while 3.9% were assigned as electronic equipment repairmen, 3.4% as communications and intelligence specialists, 6.5% in medical and dental specialties, 4.5% in other technical and allied specialties, 9.7% in administrative and clerk positions, 11.2% as electrical/mechanical equipment repairmen, 2.4% as craftsmen, and 8.4% as military police. [3] (See Table 4, p 13.) None of the 118 openings for animal laboratory scientists were filled by the ten inductees with degrees in this field, and only 6 of the 337 openings for psychologists were matched with the 1,418 men with degrees in psychology who were inducted that year. [4] (These numbers do not include the few assignments into the Science and Engineering Aide program where approximately 1,370 slots existed, with about half of them opening up each year. The DoD data includes those assigned to the S&E slots within the "assignment unknown" category which includes all direct assignments to duty.)

The Scientific Manpower Commission, while understanding the Army's need to respond to widespread and intense reaction on the part of many individuals and groups in the nation to what they perceived as overrepresentation of the poor and blacks among the Vietnam casualties, and appreciating the need to continue the enlistment incentives program of quaranteed schooling assignments, also recognized that our trained technological manpower represents a valuable and irreplaceable resource vital to the well-being of the nation. SMC's efforts to increase the utilization of trained men in those areas where the Army needed such

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[2] Ibid. Table IV
[3] Ibid. Table V
[4] Ibid. Table IV

training was based on a belief that the national investment already made in the education of these men and the national need for the services they were uniquely qualified to provide both in and out of the service justified the effort to assist and encourage the Army in any way possible to utilize their training. Additionally, SMC wanted to assist the individuals involved to obtain military jobs where they felt they could contribute the most to their country, and hopefully could work at something related to their training. Unlike most other areas of work specialty, technology changes rapidly enough that men completely out of their field for a two year period not only find their knowledge and skills "rusty" but also to some degree obsolescent when they try to return to their chosen careers.

While there is no way to be certain of the effectiveness of the work of the Scientific Manpower Commission in attempting to bring about a better utilization of the graduate scientists and engineers with whom it dealt during this period, the information produced by this study indicates that civilian skills were utilized for a much larger proportion of this group than was true for the full spectrum of college graduates on whom we have data. A major part of that difference may lie in the fact that a majority (60%) of the scientists and engineers with whom we worked had completed at least one year of graduate school before induction.

MILITARY UTILIZATION

Composition of Sample

From June 1968 when the notice of possible help appeared in SCIENCE until mid-1972 when draft calls stopped, more than 3,000 inquiries were received by the Scientific Manpower Commission from scientists and engineers who felt they were about to be drafted. Among the 1,722 who followed up their initial contact, 509 filled out the basic information sheet (Appendix A-1) and returned it to us but did not ever send their basic training address. We assume that many of these failed induction physicals or for some other reason did not enter the service.

Only 127 of the 1,722 were able to enter OCS programs. Two more found openings in a Reserve program; 14 were drafted into the Marines; 104 failed their induction physical and notified us; 4 were given a medical discharge during basic training (two because of injuries); and 135 sent a basic training address but never followed up with information as to their Military Occupation Specialty. For 206, the first MOS assigned after basic training is known, but we were unable to reach them with a final questionnaire sent out in 1973 (Appendix A-3) and so we do not known whether they continued in the first MOS or changed assignments. The 621 who returned the final questionnaire form the basis for most of the data in this report.

A comparison of the major field composition and highest degree of

the sample on which all information is known and the remaining group in which only the first MOS is known shows only small variation (Appendix Table A). In the full-information sample, a higher proportion had completed at least one year of graduate study (60% compared to 52%) and there were proportionally fewer chemists and more mathematicians in the larger group, but the physical sciences/math total proportion was very similar. The assignment categories are also generally similar to the final assignments.

Within the group who returned the final questionnaire (Fig. 1) almost 35% were physical scientists, 17.3% were biological scientists, 31.6% were engineers, about 4% were psychologists, 6% were social scientists, and 6.5% were scattered among other majors, principally business. By degree level, 39.9% had completed a bachelor's only, 24.8% had completed one additional year of graduate school and 35.3% had completed two years of graduate school, received a master's degree or a doctorate. Three men in the sample had completed their Ph.D. before being inducted as privates.

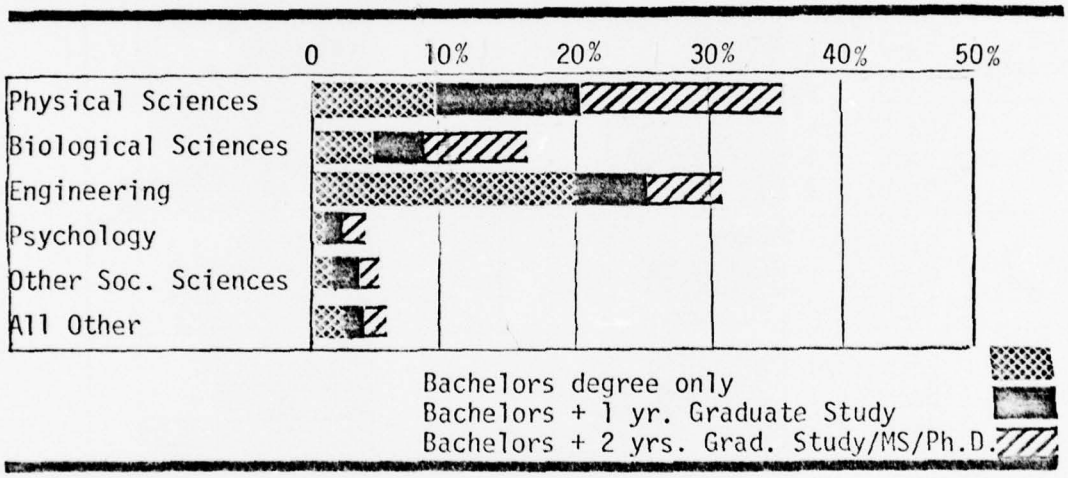

Fig. 1 Composition of sample by field and degree level.

As would be expected, the physical scientists and biological scientists had higher educational levels than the engineering graduates, and were more likely to have entered service straight from school than the engineers, many of whom had had occupational deferments for a year or more before they were drafted. The average age of the total group was between 23 and 24 years.

Military Occupation Specialty

Assignments out of basic training were of two kinds - those where the men went directly from basic training into a job specialty or on-the job training and those that required Advanced Individual Training (AIT)

through a service school that varied in length from a few weeks to more than a year. In a substantial number of cases, AIT assignments were made and advanced training completed in some field that was never utilized by the services for the individual concerned. A comparison of the first MOS as it relates to utilization of civilian skills (Appendix Table B) with the utilization of skills in the MOS used most of the time in service (Appendix Table C) shows shifts of 3 or 4 percent in assignments that utilize civilian skills either directly or collaterally and those that did not, including combat assignments (Figure 2).

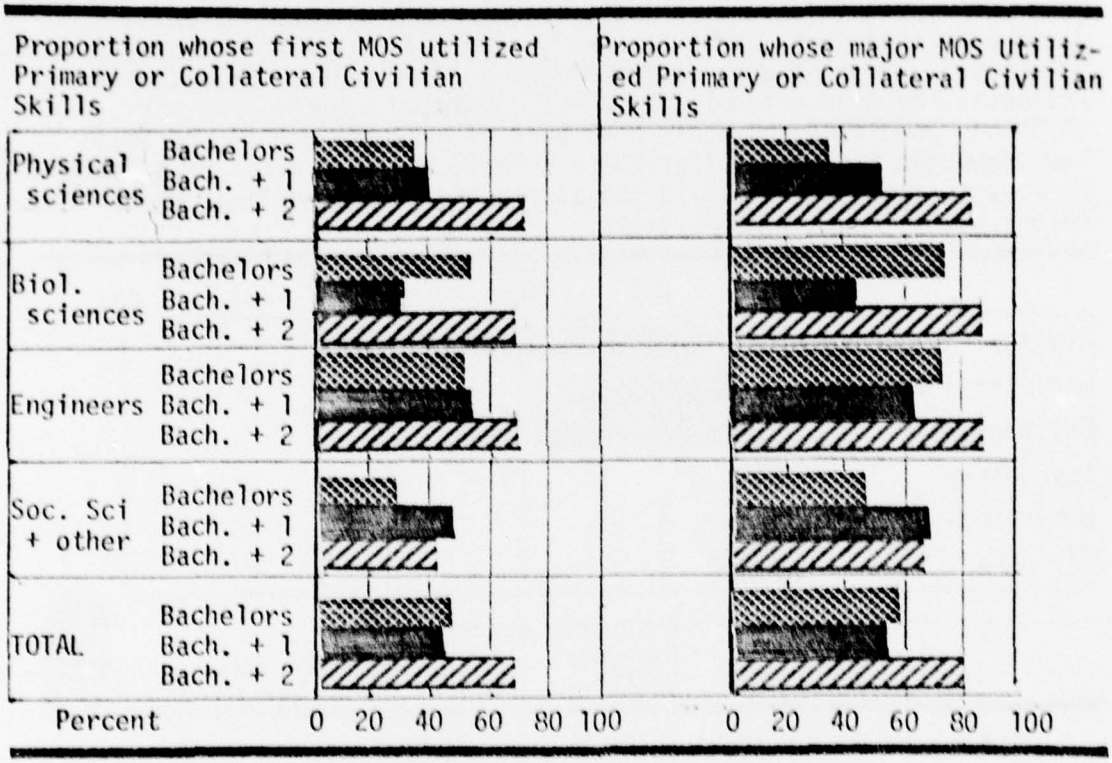

Fig. 2 Proportion utilizing primary or collateral civilian skills in first MOS and in major MOS, by field and degree level.

Part of this difference is in the composition of the two samples, since the first MOS is known for 821 men and the major MOS is known for only 614. However, the shifts from first MOS to the MOS where the majority of military service was performed is much more striking when the individual records are compared, since internal shifts often counterbalance each other.

A surprisingly high proportion (41.9%) of the 310 men who completed AIT in a military service school served only a few weeks or not at all in that MOS or a related specialty for which they had received advanced military training. The most common switch was from a MOS such as 11B (combat infantry) to a clerk/typist or administrator position. In contrast to men in 11B, men with AIT for MOS 13E (field artillery-cannon)

seldom switched to any other work. The other two groups that most consistently continued to be assigned in the area of their advanced military training were those assigned as military police in 95B and in the medical groupings. (These data assume that no AIT was given to men in this study who were assigned directly into computer programming, the Science and Engineering Aide Program, or the clerk/typist occupational grouping.) For the men in this sample, at least, there appears to have been considerable wastefulness in training them for military occupations they were not assigned to perform.

This sample of college-graduate inductees was atypical in a number of ways. First, the sample consists principally of graduates in scientific and engineering disciplines - 84% were physical and biological scientists, engineers and mathematicians, with an additional 10% in the social sciences. Among all college graduates who entered the Army as enlisted men in 1969, only 28% had degrees in physical and biological sciences, mathematics and engineering plus an additional 27% in the social sciences. [5] Second, the level of graduate training is considerably higher than for the majority of college graduates who were inducted into the enlisted ranks. DoD has no breakdown of degree or post-baccalaureate training levels of the 1969 sample, but 60% of the SMC sample had completed at least one year of graduate training. For comparison, among the 17,578 college graduates inducted via the draft from July 1, 1964 to January 30, 1969, 12% had completed one or more years of graduate study and 5.6% held advanced degrees. [6]

A third difference was the high proportion of these men who, as students, had been counted as outstanding in their fields by their universities or by the professional societies for their dicipline. Counting as "honors graduates" all those men who graduated cum laude, who had won National Science Foundation, Woodrow Wilson, or other prestigious competitive graduate fellowships, or who were members of Phi Beta Kappa or Blue Key or the honorary society for their discipline, 47.5% of the men whose highest degree was the bachelor's were honors graduates as were 60.7% of those who had completed one year of graduate school and 78.8% of those who had completed two or more graduate years or a master's degree. Among college graduates as a whole, the proportions would have been about 10%, 25% and 30%.

As shown in Fig. 3 and in detail in Appendix Table D, the Army was less likely to utilize bachelor's degree honors graduates within this sample in their civilian specialty than non-honors graduates. Among those who had completed a year of graduate school, a slightly higher proportion of the honors graduates than their cohorts were utilized in their fields as was also true among those with an advanced degree or two or more years of graduate school.

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[5] Ibid. Table II

[6] Scientific Engineering Technical Manpower Comments, Vol. 6, No. 6 (June 1969), p. 19.

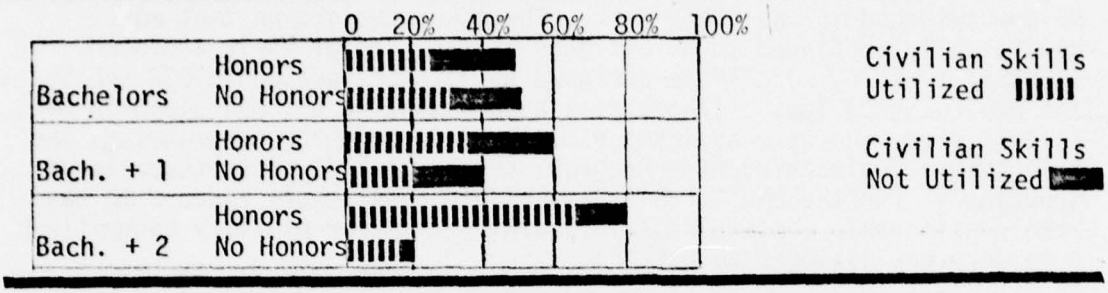

Fig. 3 Utilization of Civilian skills among honors and non-honors graduates, by degree level.

Comparison with Other Surveys

Following World War II, the Department of the Army and 31 scientific societies completed a study titled Scientists in Uniform - World War II, prepared as a report to the Deputy Director for Research and Development, Logistics Division, U. S. Army. 2/ The objective of the study was to determine the degree of utilization of scientists in the military service and to make recommendations for better utilization in subsequent war time periods.

The World War II study did not differentiate between scientists used at the enlisted level and those who were commissioned, although most of the scientists served as officers.

Table 1 - COMPARISON OF SAMPLE COMPOSITION OF WORLD WAR II STUDY AND SMC STUDY

	WORLD WAR II SAMPLE		SMC SAMPLE - VIETNAM PERIOD	
FIELD	Total No.	% of Total	Total No.	% of Total
Biology	2542	16.8	106	20.2
Chemistry	4506	29.7	85	16.2
Engineering	5283	34.9	194	36.9
Geosciences	716	4.7	17	3.2
Mathematics	317	2.1	54	10.3
Physics	623	4.1	47	8.9
Psychology	1,170	7.7	23	4.4
TOTAL	15,157	100	526	100

Note that WWII study includes both commissioned and enlisted scientists. Men in SMC study were all enlisted.

2/ Scientists in Uniform - World War II - A Report to the Deputy Director for Research and Development, Logistics Division, General Staff, U. S. Army, Washington, D. C. 1948.

Table 2 - DEGREE OF UTILIZATION OF SCIENTISTS IN MILITARY SERVICE
COMPARISON OF WORLD WAR II STUDY AND SMC VIETNAM STUDY

	WORLD WAR II STUDY		SMC STUDY*	
	No.	Percent	No.	Percent
1. Well utilized	4486	29.6	96	17.9
2. Used Scientific skills half the time	2334	15.4	115	21.5
3. In collateral field	2773	18.3	94	17.6
4. Small portion of time	2076	13.7	73	13.6
5. None	3488	23.0	157	29.3
TOTAL	15,157	100.0	535	100.0

*Social science and "Other" omitted

The comparative representation of each of the scientific fields within the sample for the World War II study and the sample for this study is shown in Table 1. Table 2 compares the degree of utilization of civilian skills of the scientists in the two studies.

Although the men in the World War II study generally were commissioned, their level of scientific education was closer to that of the men in the SMC study than to the general college graduate science population represented among college graduate inductees of 1969 as shown in a DoD study during the Vietnam period [8]. It is interesting to note that in a time of all-out mobilization such as World War II, the proportion of scientists whose civilian skills were never used (23%) (Table 2) is smaller than the proportion in the SMC sample (29.3%) and much smaller than in the DoD Vietnam sample (Table 4) where more than 70% of the scientists and engineers inducted in 1969 as enlisted college graduates were assigned to MOS's that did not utilize their civilian-acquired skills either primarily or peripherally. This would appear to indicate that the military services had little need for scientists in the enlisted ranks during the Vietnam period. A study of the utilization of the scientists in the commissioned ranks might produce a figure more nearly comparable to that of World War II. The World War II study says,

> "Numerous plans calculated to enhance the nation's civilian strength in science and scientific manpower recently have been proposed and some are being implemented. As far as is known, attention is not being given to specific procedures and mechanisms for effective mobilization, allocation, and

[8] Statistics ... Op. Cit.

Table 3

NUMBER & PERCENT OF ENLISTED COLLEGE GRADUATES IN SELECTED MILITARY FUNCTIONS - SMC SAMPLE COMPARED WITH DoD DATA FOR 1969 ON FIRST ASSIGNMENT AFTER BASIC

MAJOR FIELD		TOTAL	Tactical Combat 11-17	Electronic Maintenance 21-35	Communications & Intelligence 04,05,72 96-98	Medical Specialists 91	Other Technical Specialists 01,92,54 81-85	Admin. & Clerks 71	Data Processing 74	Elec-Mec Equip. Maintenance 52-55 61,64-65 67-68,36 41,45-46	Law Enforcement 95	Musician 02	All Other OTHER
PHYSICS	SMC No	47	2	5	4	3	22	4	6		1		
	SMC %		4.2	10.6	8.5	6.3	46.8	8.5	12.8		2.1		
	DoD No	762	282	76	26	58		50	8	92	58	4	108
	DoD %		37	10	3.4	7.6		6.6	1.0	12.1	7.6	.5	14.2
CHEMISTRY	SMC No	85	10	2	2	2	48	10	1		5	1	4
	SMC %		11.7	2.3	2.3	2.3	56.4	11.8	1.2		5.9	1.2	4.7
	DoD No	1180	356	42	42	176	88	118	8	78	50	8	214
	DoD %		30.2	3.6	3.6	14.9	7.5	10	.6	6.6	4.2	.7	18.1
MATH/STAT	SMC No	54	6	1	4	1	19	9	10		1	1	2
	SMC %		11.1	1.8	7.4	1.8	35.2	16.6	18.5		1.8	1.8	3.7
	DoD No	1325	318	70	74	138	12	330	36	155	14	22	156
	DoD %		24	5.3	5.6	10.4	.9	24.9	2.7	11.7	1.1	1.6	11.8
GEOSCIENCES	SMC No	17	2		1		4	8			1		1
	SMC %		11.8		5.9		23.5	47			5.9		5.9
	DoD No	374	78	18	16	38	6	38	6	32	26	2	114
	DoD %		20.9	4.8	4.3	10.2	1.6	10.1	1.6	8.6	7.0	.5	30.5
ALL PHYSICAL SCIENCES	SMC No	203	18	8	11	6	93	31	17		8	2	9
	SMC %		8.9	3.9	5.4	3.0	45.8	15.3	8.4		3.9	1.0	4.4
	DoD No	4959	1598	228	200	504	118	644	62	507	224	42	832
	DoD %		32.2	4.6	4.0	10.2	2.4	13.0	1.2	10.2	4.5	.8	16.7
BIOLOGICAL & MEDICAL SCIENCES	SMC No	106	8	1	2	13	58	15	1		3		5
	SMC %		7.5	.9	1.8	12.2	54.7	14.1	.9		2.8		4.7
	DoD No	2928	994	80	108	580	144	336	16	170	114	8	378
	DoD %		33.9	2.7	3.7	19.8	4.9	11.5	.5	5.8	3.9	.2	12.9
ALL ENGINEERING	SMC No	194	19	12	4	6	115	13	8		6		11
	SMC %		9.8	6.2	2.1	3.1	59.3	6.7	4.1		3.1		5.7
	DoD No	4176	1780	142	122	234	22	334	18	403	32	28	1061
	DoD %		42.6	3.4	2.9	5.6	.5	8.0	.4	9.6	.7	.6	25.4
PSYCHOLOGY	SMC No	23	1			11	7	4					
	SMC %		4.3			47.8	30.4	17.4					
	DoD No	1424	364	12	54	410	32	258	12	62	80	12	128
	DoD %		25.6	.8	3.8	28.8	2.2	18.1	.8	4.3	5.6	.8	8.9
OTHER SOCIAL SCIENCES	SMC No	38	3		1	5	2	24	1			1	1
	SMC %		7.9		2.6	13.1	5.3	63.2	2.6			2.6	2.6
	DoD No	9938	2820	154	704	1242	78	2600	130	494	576	84	1056
	DoD %		28.3	1.5	7.1	12.5	.8	26.1	1.3	5.0	5.8	.8	10.6
ALL OTHER	SMC No	51	8	2	2	3	9	8	7		1	1	10
	SMC %		15.7	3.9	3.9	5.9	17.6	15.7	13.7		1.9	1.9	19.6
	DoD No	18,549	6085	340	869	1888		4383		564	260		4160
	DoD %		32.8	1.8	4.7	10.2		23.6		3.0	1.4		22.4
TOTAL	SMC No	615	57	23	20	44	284	95	34		18	4	36
	SMC %		9.3	3.7	3.3	7.2	46.2	15.4	5.5		2.9	.6	5.8
	DoD No	41,974	13641	956	2057	4858	394	8555	238	2200	1286	174	7615
	DoD %		32.5	2.3	4.9	11.6	.9	20.4	.6	5.2	3.1	.4	18.1

utilization of the nation's scientific manpower should war come again. *The nature of present planning based on a draft law similar to that of World War II suggests that if war were declared at once, we would utilize much the same methods for this purpose as were used previously."* [9]

Changes that came about in the draft law and regulations after this statement was written in 1948 obviously went in the opposite direction in terms of providing for better utilization of scientists and engineers in the military service. The World War II study further notes that

> "If the available scientists were not fully utilized it is questionable if the fields of technology which they represented were applied effectively to the prosecution of the war." [10]

World War II was a full-scale national mobilization and Vietnam was not. However, the latter war did represent a very large expenditure of resources and manpower. In the case of skilled scientists, many could probably have been more usefully allocated than they were.

A second comparison may be made with an unpublished study by the Department of Defense. In June 1970, DoD compiled "Statistics on the Utilization of Enlisted College Graduates in the Department of Defense," [11] tabulating assignments from recruit training to DoD occupational specialties during calendar year 1969. A comparison of the assignments of the scientists and engineers in this DoD study with those men in the SMC sample is shown in Tables 3, 4 and 5. A much higher percentage of men in the DoD sample were assigned to tactical combat MOS than were those in the SMC sample (Table 3). Conversely, a much smaller percentage of men in the DoD sample were assigned to technical specialties than in the SMC sample. This is certainly in part a reflection of the higher educational level of the SMC sample, but it may also reflect some measure of adjustment brought about by SMC's calling these particular men and their qualifications to the attention of the Pentagon.

Table 4 - PERCENT UTILIZATION OF CIVILIAN SKILLS AS SHOWN BY FIRST MILITARY OCCUPATION SPECIALTY - DoD STUDY OF ENLISTED COLLEGE GRADUATES IN 1969 - BY FIELD

FIELD	Civilian Skills Utilized Primarily or Partially	Civilian Skills Not Utilized		
		Combat MOS	Non-Combat	TOTAL
Physical Sciences	11.2%	35.8%	52.9%	88.7%
Biol. Sciences	29.1	36.0	35.1	71.1
Engineering	19.6	49.9	30.8	80.7
Social Sciences	28.7	30.4	40.9	71.3

9/ Scientists in Uniform... Op. Cit. p. 2
10/ Ibid. p. 12
11/ Statistics... Op. Cit

Table 5 - PERCENT UTILIZATION OF CIVILIAN SKILLS AS SHOWN BY SELF-EVALUATION - SMC SAMPLE - BY FIELD

FIELD	Primary or Collateral Civilian skills used at least some of time	Civilian Skills Not Utilized		
		Combat MOS	Non-combat MOS	TOTAL
Physical Sciencies/Math	61.0%	10.3%	28.7%	39.0%
Biological Sciences	69.8	8.5	21.7	30.2
Engineering	73.7	9.3	17.0	26.3
Soc. Sciences	72.1	6.5	21.4	27.9
TOTAL	70.8	9.4	19.8	29.2

As shown in Table 4, less than 30% of the enlisted college graduates in the science fields who entered the Army in 1969 were placed in MOS that could have utilized any of their civilian acquired skills. In the SMC sample, on the other hand, Table 5 shows that 70% utilized these skills at least part of the time.

On the final questionnaire sent out to the men in the SMC sample when they had completed their military service, they were asked to evaluate the military use of their civilian skills. SMC also made such an evaluation based on the major MOS. These two sets of data are correlated in Table 6 and show the proportion at each degree level that viewed the utilization of their civilian skills in the same way SMC did, based on MOS. At the higher degree level, the discrepancy is the widest, with SMC assuming a skill utilization at least half the time for 68% of the group while only 58% of the individuals said that they did utilize their civilian skills that much. The reasons for the discrepancy frequently show up in the comments where even some of those men assigned to a Science and Engineering Aide position felt that their military job utilized very little of their civilian-acquired skills. However, the most important difference is in degree level. Bachelor's level men were more likely to feel they utilized civilian skills at least half the time than appeared to be true from the SMC evaluation using the MOS. On the other hand, those who had finished at least two years of graduate study or an advanced degree were much less likely than was SMC to feel that their civilian skills were used. This undoubtedly reflects a finer definition of "civilian skills" among those with more formal schooling, as well as an indication that the enlisted slots for scientists and engineers did not require and did not necessarily use skill levels commensurate with graduate training.

The SMC evaluation showed that 34% did not utilize their civilian skills in their major MOS, while only 29% of the men said these skills

Table 6

COMPARISON OF SELF-EVALUATION OF MILITARY USE OF CIVILIAN SKILLS WITH EVALUATION BY SMC BASED ON MAJOR MILITARY OCCUPATION SPECIALTY BY FIELD AND EDUCATION LEVEL

			BACHELORS				BACHELORS + 1 YR				BACHELORS + 2 YR/MAS/DOC			
FIELD	Evaluation by	TOTAL NO.	TOTAL	Util skills at least half time	Util collateral skills some	No civ. skills utilized	TOTAL	Util skills at least half time	Util collateral skills some	No civ. skills utilized	TOTAL	Util skills at least half time	Util collateral skills some	No civ. skills utilized
PHYSICS	SELF	47	12	3	4	5	20	7	6	7	15	9	4	2
	SMC	47	12	2	4	6	20	8	5	7	15	12	2	1
CHEMISTRY	SELF	85	22	7	3	12	22	4	6	12	41	26	9	6
	SMC	85	22	6	3	13	22	7	4	11	41	31	3	7
MATH/STAT/ COMPUTER SCI	SELF	55	20	10	1	9	17	7	6	4	18	14	3	1
	SMC	54	20	3	3	14	16	6	3	7	18	17		1
GEOSCIENCES	SELF	17	3		1	2	4			4	10	2	3	5
	SMC	17	3			3	4			4	10	4		6
ALL PHYSICAL SCIENCES	SELF	213	59	21	9	29	66	18	20	28	88	54	19	15
	SMC	213	59	11	11	37	66	21	13	32	88	66	6	16
BIOLOGICAL SCIENCES	SELF	106	28	11	10	7	23	8	3	12	55	23	22	10
	SMC	106	27	14	5	8	23	9	1	13	56	37	8	11
ALL ENGINEERING	SELF	194	129	61	30	38	30	12	8	10	35	25	6	4
	SMC	194	129	62	30	37	30	16	4	10	35	29	2	4
PSYCHOLOGY	SELF	23	2	1		1	11	6	2	3	10	9	1	
	SMC	23	2	1	1		11	5	2	4	10	8	2	
OTHER SOCIAL SCIENCES	SELF	38	12	2	5	5	11	3	6	2	15	9		6
	SMC	38	12	1	2	9	11	2	5	4	15	2	4	9
ALL OTHER	SELF	40	16	8	4	4	11	8	1	2	13	6	4	3
	SMC	40	16	6	2	8	11	4	4	3	13	5	4	4
TOTAL	SELF	614	246	103	58	84	152	55	40	57	216	126	52	38
	SMC	614	245	95	51	99	152	57	29	66	217	147	26	44

were never utilized. The explanation for the discrepancy again appears to be largely in the many changes in type of assignment that occurred, often resulting in an assignment toward the end of the enlistment which utilized civilian skills, but which does not appear as the major MOS, since the amount of service time in that activity was less than half the active duty time after basic training.

Table 7 shows the detailed self-evaluation responses of the SMC sample as they viewed the military utilization of their civilian skills compared with the utilization level assumed from the major MOS. Their responses show that only 82% of the bachelor's, 72% of those with one year of graduate study, and 75.5% of those with at least 2 years of graduate study or an advanced degree who were given "ideal" assignments said they utilized their primary civilian skills even half of the time. Only 35% of the bachelor's, 45% of the bachelor's plus one year, and 36% of those with 2 years of graduate study or graduate degrees who were given assignments that seemed to utilize collateral skills (i.e. a physicist assigned as a computer programmer) said that they had used their collateral skills most of the time.

Among those given non-combat assignments such as clerk/typist that were unrelated to their civilian skills, 84% of the bachelor's, 85% of the bachelor's plus one year, and 82% of the bachelor's plus two years agreed with the SMC evaluation of the relationship of civilian skills to military work.

For those assigned to tactical combat MOS, 88% of the bachelor's, 94% of the bachelor's plus one, and 100% of the bachelor's plus two years' men agreed that their assignments bore no relationship at all to their civilian skills. However, one bachelor of science in chemical engineering felt that he was ideally utilized in the MOS 13E, and three more engineers with MOS 13E said they used their primary skills at a low level of competence and their collateral skills such as geometry some of the time.

POST-SERVICE PLANS

The final SMC questionnaire asked those men completing or who had just recently completed their military service to state their plans following service. Their responses, by field and degree are shown in Table 8. Within the total group, 50% of those who had completed only a bachelor's degree indicated that they were returning to graduate or professional school, either in the same field as the bachelor's or in a different field. Among those who had completed one year of graduate study, 78.9% indicated their intention to return immediately to graduate school, although some expected to be simultaneously employed; and 65.4% of the men with an advanced degree or at least two years of graduate training said they planned to return immediately to graduate school.

Table 7

SELF-EVALUATION OF CIVILIAN SKILL UTILIZATION COMPARED WITH UTILIZATION LEVEL ASSUMED FROM MAJOR MILITARY OCCUPATION SPECIALTY - BY EDUCATIONAL LEVEL

Utilization of Civilian Skills Self Evaluation	TOTAL	MAJOR MOS UTILIZES SKILLS WELL				COLLATERAL SKILLS UTILIZED IN MAJOR MOS				CIVILIAN SKILLS NOT UTILIZED-NON-COMBAT MOS				CIV. SKILLS NOT UTILIZED COMBAT MOS			
		Total	B	B+1	B+2/M/D	Total	B	B+1	B+2/M/D	Total	B	B+1	B+2/M/D	Total	B	B+1	B+2/M/D
1. Utilized most of the time	109	97	33	21	43	8		4	4	3		1	2	1	1		
2. Utilized at least half the time	51	39	15	6	18	11	6	3	2					1	1		
3. Utilized, but lower competence level-most time	81	62	22	9	31	14	8	2	4	5	3	1	1				
4. Utilized, lower competence level half the time	43	31	7	5	19	11	5	3	2					1	1		
5. Used collateral skills most of time	111	53	12	9	32	40	18	13	9	16	7	5	4	2	1	1	
6. Utilized primary or collateral skills short time	39	13	5	5	3	11	5	3	3	9	5	4		6	5		1
7. Civilian skills never utilized	178	3		2	1	11	9	1	1	118	49	37	32	46	25	17	4
TOTAL	612	298	94	57	147	106	51	29	25	151	64	48	39	57	34	18	5

Table 8

POST SERVICE PLANS BY FIELD AND EDUCATIONAL LEVEL

FIELD	DEGREE LEVEL		TOTAL	GRAD Prof. School Same Field	Grad Prof School Different Field	Grad Prof. School & employment together	Pre-Service Employment	Seek employment-field of major	Seek employment field of MOS (if different)	Remain Unemployed 6 mos or more	Stay in military service
PHYSICS	B	NO	12	6	4		1	1			
		%		50	33		8.3	8.3			
	B+1	NO	20	14	2		1	3			
		%		70	10		5	15			
	B+2 /M/D	NO	15	9	1			5			
		%		60	6.6			33.3			
CHEMISTRY	B	NO	22	7	1	5	6	2		1	
		%		31.8	4.5	22.7	27.3	9.1		4.5	
	B+1	NO	22	20	1	1	6	1		1	
		%		90.9		4.5		4.5			
	B+2 /M/D	NO	43	32	4	1	1	5			
		%		74.4	9.3	2.3	2.3	11.6			
MATH/STAT/ SC	B	NO	20	8		2	6	2		1	1
		%		40		10	30	10		4.5	4.5
	B+1	NO	16	11	1	1	1	2			
		%		68.7	6.2	6.2	6.2	12.5			
	B+2 /M/D	NO	20	9		1	6	4			
		%		45		5	30	20			
GEOSCIENCES	B	NO	2		2						
		%			100						
	B+1	NO	4	4							
		%		100							
	B+2 /M/D	NO	10	5		1	1	3			
		%		50		10	10	30			
ALL PHYSICAL SCIENCES	B	NO	56	21	7	7	13	5		2	1
		%		37.5	12.5	12.5	23.2	8.9		3.6	1.8
	B+1	NO	62	49	2	2	2	6			
		%		94.2	3.8	3.8	3.8	11.5			
	B+2 /M/D	NO	88	55	5	3	8	17			
		%		62.5	5.7	3.4	9.1	19.3			
BIOLOGICAL SCIENCES	B	NO	27	9	3	1	4	9	1		
		%		33.3	11.1	3.7	14.8	33.3	3.7		
	B+1	NO	23	17	4	2					
		%		73.9	17.4	8.7					
	B+2 /M/D	NO	57	34	10	2	2	9			
		%		59.6	17.5	3.5	3.5	15.8			
ENGINEERING	B	NO	128	16	15	21	54	21	1		
		%		12.5	11.7	16.4	42.2	16.4	.7		
	B+1	NO	30	16	1	5	4	4			
		%		53.3	3.3	16.6	13.3	13.3			
	B+2 /M/D	NO	35	9	1	2	6	16	1		
		%		25.7	2.8	5.7	17.1	45.7	2.8		
PSYCHOLOGY	B	NO	2	1		1					
		%		50		50					
	B+1	NO	11	10		1					
		%		90.9		9.1					
	B+2 /M/D	NO	10	6		1	2	1			
		%		60		10	20	10			
OTHER SOCIAL SCIENCES	B	NO	12	4	5	2		1			
		%		33.3	41.6	16.6		8.3			
	B+1	NO	11	6	1	2	2				
		%		54.5	9.1	18.2	18.2				
	B+2 /M/D	NO	16	7	4			5			
		%		43.75	25			31.2			
ALL OTHER	B	NO	19	3	1	5	8	2			
		%		15.8	5.3	26.3	42.1	10.5			
	B+1	NO	15	6	2		1	1			
		%		40	13.3		6.6	6.6			
	B+2 /M/D	NO	11	3			1	7			
		%		27.3			9.1	63.6			
TOTAL	B	NO	244	54	31	37	79	38	2	2	1
		%		22.1	12.7	15.2	32.4	15.6	.8	.8	.4
	B+1	NO	152	109	11	12	9	11			
		%		71.7	7.2	7.9	5.9	7.2			
	B+2 /M/D	NO	217	114	20	8	19	55	1		
		%		52.5	9.2	3.7	8.7	25.3	.5		

There was considerable variety within the disciplines. Among the physical scientists, 62.5% of the bachelor's, 85.5% of those with a year of graduate school and 71.6% of those with two or more years of graduate work plan to return to graduate school compared with only 40.6% of the bachelor engineers, 73.3% of the engineers with one year of graduate training and 34.3% of those with a master's or two years beyond the baccalaureate.

One of the often-cited "results" of the draft was to push students into college who would not otherwise have gone, but who preferred college to being drafted. This seems to be borne out in 1972 fall enrollment statistics for freshmen men by Census Bureau population figures[13] which show that the proportion of men of college age enrolled in college declined by nearly 9 percentage points between 1969 and the fall of 1972. In 1969, 44% of all men age 18 and 19 were enrolled in college and that percentage dropped to 37.6% in the fall of 1972 when the draft had effectively ceased to be a factor in the choice of young men. In the 20-21 age group, 44.7% of the men were college-enrolled in 1969 and only 36% in 1972.

Many persons assumed that students entering graduate school were equally influenced by the draft, and that many young men who enrolled in graduate school had done so principally to avoid or delay military induction. While this may be is true (and there are no studies to prove or disprove it) the SMC statistics on plans following service show that more than three fourths of the men who had completed only one year of graduate school in the sciences before being inducted planned to return to graduate school to complete the higher degrees they had been seeking when military service intervened. The engineers were less likely to be returning to graduate school than were the physical and biological scientists, while among the small group of non-science majors, only 53.3% who had completed one year of graduate study planned to return to graduate school.

Among those men who had completed two years of graduate school but not yet received an advanced degree, 71% were going back to graduate school. This number included all of the chemists, one third of the physicists, two thirds of the biological scientists, and both the two engineers in this category.

Engineers were more likely to be returning to pre-service employment, particularly whose with only a bachelor's degree.

Only one man was staying in service, and only three planned employment in their military MOS field when it differed from the college major.

One may conclude from these data that military service was definitely an interruption in an educational plan that continued to be pursued

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[13] Scientific, Engineering, Technical Manpower Comments, Vol. 10, No. 3, March 1973, p. 21.

following military service; that an insignificant number received training in the military service that they planned to utilize later as civilians; and that military service was not attractive enough to retain them after their required period of service was completed.

THEIR COMMENTS

Probably the most revealing part of the questionnaire was an open-space invitation for comments from anyone who cared to make them. More than 90% of the men who filled out the final questionnaire and returned it did make comments - some of them in great detail.

Generally, these comments can be separated into four categories - reactions to how the Army operates; types of assignments given and attempts to get changes in assignments; the relationship of the efforts of the Scientific Manpower Commission to the individual's assignments; and comments about the Science and Engineering Aide Program.

The comments of these men are valuable insofar as they offer insight to help the Army understand the reactions of this kind of draftee toward the Army following his service therein; contain suggestions for change that might improve the degree of voluntary participation in military service by men of above-average intelligence and education; and offer suggestions for the utilization of this kind of highly educated man if the draft should again be reinstated and men with these qualifications inducted involuntarily for service.

How the Army Operates

Comments here ranged from a simple "F.T.A." to constructive suggestions for improvement.

Forty-nine respondents stated in various ways their feeling that the Army is narrow-minded, using a by-the-book set of procedures that did not allow for change or adaptation even when the circumstances indicated such change would be beneficial. They felt that common sense was applied all too rarely to making assignments, and faulted the Army for not only ignoring civilian-acquired skills but also failing to utilize those skills acquired through Army training.

- A civil engineer with one year of graduate study completed noted that

> "While SMC was helpful in my obtaining a secondary MOS, I never had a chance to use it. The military made no attempt at all to use my engineering skills and abilities. 99% of all the college graduates I met in the Army had the same complaint."

- A chemist with one year of graduate training noted that

> "My military records clearly indicate that I attended college for five years. Yet the Army sent me to school for 36 weeks after completion of basic training so that by the time I had completed school I had exactly one year left in the Army. Surely this is not efficient utilization of my previous skills, since my degree is in chemistry, and I was trained to repair computerized equipment. My case is not an isolated one - there were six college graduates in my class of 18 at Fort Monmouth. Is it any wonder that the military requires so many tax dollars in order to operate with this type of organization? Why train people who are already trained? Why not put them 'on the job' where they are already specialized?"

- A draftee with a master's degree in applied mathematics says that

> "My assignment as a computer programmer in Vietnam was in spite of, rather than because of 'the Army's system'. I was trained for seven months in the states as a radio teletype operator (05C) since somehow it had been determined that the need for RTT operators was so great it was better to spend the time (and money) to train me as one than to utilize any of my civilian acquired skills. When I got to Vietnam: (1) there was a great over-supply of RTT operators; (2) there was either a shortage of computer programmers or an inability to distribute them properly in Vietnam; and (3) I met a school mate of mine (a sergeant working in personnel, sensibly matching qualifications with requirements) who sent me in to fill a needed slot. Moral: No one in the Army knows its specific long range manpower requirements - or knows and doesn't care. In any case, there seems to be little connection between the Army-wide supply of qualified personnel and the specific requirements in the field."

- A bachelor's degree physicist (also Phi Beta Kappa and a Woodrow Wilson Fellow) was trained for 14 months after basic to become a Vietnamese interrogator/linguist (MOS 96C2LVS). He says

> "I was sent to Vietnam in this MOS, but the first night of in-processing, volunteers were asked to work as computer programmers. Naturally I volunteered, got the job and had my MOS changed to 74F. Twice earlier I tried to get this 74F MOS or be moved into 01F (Physical Sciences Assistant) - once in basic training and once about eight months later. Neither time was I successful. I ended up as a 74F only by being in the right place at the right time. So goes the Army!"

Several other men pointed out that it is often who you know rather than what you know that makes change possible, or that the opportunity to utilize previous skills is a matter of happening to be in the right place at the right time rather than the result of planned individual matching on the part of the Army. Some men noted (accurately) that the opportunity to utilize previously-acquired skills is strongly dependent on the Army's table of openings on the day that a man completes basic training. If the opening happens to come up a few days or even a few weeks off the time that a man with those skills completes his training, the match will not usually be made.

- A metallurgical engineer who served his military time as a clerk/typist pointed out that

> "While I was in Germany, an engineer was needed for a particular project. I was qualified, but the position required a civilian so I couldn't have it. Consequently, they had to pay a civilian at a high GS rate while they could have had me for the $200 per month I was getting for pushing papers."

He suggests that the services could make much better use of highly trained men who are drafted by letting them serve their two years in any of the services which happen to need their special training and qualifications. [This did occur in one instance when, with DoD help, a master's degree oceanographer draftee was allowed to transfer to the Navy.] He points out that the "mass induction of draftees causes mass confusion to educated people," although he considers the system "relatively efficient" for the average person being inducted. He also suggested that

> "When you pick out the MOS you would like and are sent to an officer to plead your case for such a technical MOS, it would help if that officer could talk in terms that the inductee is using. He should know the difference between a chemical and a mechanical engineer for example and shouldn't just sit there listening, saying yes he understands, when he really doesn't. Possibly an engineering officer that knew what jobs were available for scientists and engineers would be helpful to the cause rather than the liberal arts graduate who went through ROTC and thinks we have a chemical corps or maybe has heard of our arsenals and proving grounds. Some pre-processing of college graduate inductees might have resulted beneficially in using particular interviewers more familiar with their backgrounds for these men."

- One of the most frequently voiced complaints against the Army is that it destroys initiative. A master's degree nutritionist for example noted that

> "While I ended up as a food inspector which is a little closer to my field of study than was my first assignment as

a truck driver, I am thankful for that position because the Army could have treated me much worse. However, I am not grateful for the Army's tendency to destroy all initiative. Quality or rewards are based upon time in grade."

- A man with a master's degree in botany assigned into an administrative post pointed out that "The Army seems to stifle creativity rather than encouraging it."

- The stifling of ambition also appears in some cases to have a residual effect. A physicist who has completed one year of graduate study added that

> "The time spent in the service away from school not only squelched my creativity but pretty well killed my ambitions for continuing my graduate career."

On the other hand, some men noted that only through repeated use of individual initiative were they able to change assignments so that they could move into areas where they felt their training would be valuable to the service. Almost all of these men felt that internal communication within the service is poor in regard to personnel needs, and that changes sometimes can be made only because the individual learns that an opening exists and keeps pushing those in authority until somebody takes steps to match him with the open slot.

Seven men noted that either an Army recruiter or the interviewer at the processing station had given them bad advice or inaccurate information or had failed to carry through with information that was provided.

- For example, all the men who sought advice from the Scientific Manpower Commission before entering the service were told to request the opportunity to fill out DA Form 1294, the record of civilian acquired skills, since this was the most effective way to make the Army aware of their previous training. Several of them were not allowed to fill out the form because the interviewer had never heard of it, didn't have one, or said it was unnecessary; and some who did fill out the form later found that it was never processed or forwarded. A recruit with a bachelor's degree in physics noted that

> "I filled out Form 1294 when I entered the Army but then I found out the form was never processed. I wrote to my Congressman to find out what was happening and discovered that there was not even a copy in my personnel file. I thus had to refile the form, with the usual answer of 'no openings.'"

Several men who were assigned outside their areas of civilian competence reported discouragement that having lost two years from their field it would be difficult to regain their previous level of profession-

al competence. Others simply shrugged off the Army with comments such as "You can't beat the green machine"; and "The Army wasted two years of time and money and so did I - my work was not essential and my skills were never used." Almost universally, however, they pointed out that the Army could have utilized them in a way that would have been of benefit both to the service and to the individual, and that the Army's failure to do so was the cause of their frustration. None expressed resentment at having been drafted - only at their inability to perform meaningfully while in service.

Assignments

It was in the area of MOS assignments that the greatest dissatisfaction among this group of men occurred. Dissatisfaction was not limited to those who were assigned into combat, or even those whose assignments were non-combat but failed to use civilian-acquired skills. Many expressed frustration at the waste of time and money involved in training them for some combat or other unrelated skill when that training was not utilized. In many cases, including several who completed AIT in the infantry for 11B, men spoke of the wastefulness involved in sending them through AIT and then pulling them off for clerical duty, although none of these said they would have chosen to remain in the 11B MOS as a duty MOS when they had a choice of moving into a clerical position. Some, on the other hand, simply expressed gratefulness that they had not been required to serve in the infantry, in combat.

- A recruit with a master's degree in zoology says,

> "I was sent for AIT to clinical staff specialist school, a comprehensive 12-week course at Fort McClellan, Alabama. However, after the specialized training, I never used the MOS. In Vietnam, I became an administrative specialist, later personnel staff NCO."

- Others noted that the MOS assigned after basic training represented good utilization of civilian skills, but that they were sent where that MOS was not needed and where their training was not used. A man with a master's degree in mathematics who was awarded an MOS of 74F (computer programming) immediately after basic training was assigned to a unit that had no need for a man with this MOS. However, he noted that

> "In the unit to which I was assigned, there was no one capable and responsible enough to handle, sans formal training, the duties of a brigade level legal clerk. My duty MOS of 71B resulted from my being chosen by the support command CO to be his clerk and secretary."

- Within this sample of college graduates, it was not uncommon to be selected by a ranking officer for his close personal staff. For example, a bachelor's degree mechanical engineer given the primary MOS of 13E

spent his military service time working as a gardener for a general at Fort Sill. An accounting major with one year of graduate study who was awarded a primary MOS of 73C (finance specialist) noted that "In processing in, a captain saw I had an accounting degree and detained me to work at his headquarters rather than at the finance headquarters. My jobs involved only simple bookkeeping."

- Men who were assigned to a MOS at least indirectly related to their civilian-acquired skills although not in the Science and Engineering Aide Program generally said their work was indirectly related but that the work was routine and utilized little skill. Some men noted that their MOS was unrelated to their civilian training but was relatively pleasant, particularly when compared to 11B. Others said that they were occasionally able to use some of their training on the side but that this was never reflected in any MOS assigned. For example, a man with one year of graduate training in educational psychology who was assigned as a medical records clerk noted that he was able to use his civilian skills "in working with a newly formed drug amnesty program as a counsellor" on his own time.

- Among the most frustrated of draftees were men assigned to a MOS that did not utilize their civilian training, when they knew there was an open position that did require such training on the base on which they were assigned, but were unable to bring about the necessary personnel change to get that assignment. One bachelor's degree industrial engineer awarded a primary MOS of 74G (ADP systems analyst) on completion of basic training had the MOS changed to 74C (finance specialist) against his wishes when he arrived at his duty station because of more urgent unit needs. A vacancy in his MOS did exist at the time, which he requested but which was later filled by incoming personnel. A quadrilingual graduate with one year of graduate study completed in Eastern European History sought an assignment in the Netherlands where his proficiency in Dutch, French and German might be useful. He did find such an opening but was unable to get it because orders already had been cut to send him to Germany as a telex operator.

- Not all the men in this sample were unhappy with their assignments, even when the assignment was not related to their civilian specialty. Eleven men who were not in the S & E program indicated that their job was satisfying and rewarding. Three indicated that they liked their MOS although it was totally unrelated to their previous skills and training, including a man with a bachelor's degree in American civilization who was assigned for training in 91F (neuropsychiatric specialist).

- Two men assigned in 11B admitted that the Army needed them in that MOS, but said somewhat wistfully that they certainly would have preferred an assignment that utilized their civilian skills.

- Eighty-one of these draftees stated that they attempted to change the Military Occupation Specialty assigned to them at the end of basic training. Success was mixed. Six of them did get a change in assign-

ment when the Army became aware of their qualifications. Three managed to get an assignment changed because someone in the Army went outside channels. For example, a psychology major with one year of graduate study says

> "I wound up working in psychology, (91G), but it was because someone (a psychiatrist) went out of normal Army channels, grabbed me out of a replacement station in Vietnam, got my orders changed, and eventually got my PMOS changed. I was to have been assigned as a medic to a line infantry unit. The above process was specifically "outlawed" by Army brass shortly after I went through it. I worked for the most part in my new PMOS for the remaining 15 months of my enlistment, where there was pressure each time I was transferred to return to my former MOS of 91A (medic) and I sometimes was given this type of work in addition to 91G."

He goes on to point out that

> "My attempts to get into the 91G MOS through normal Army channels were unsuccessful even though I was already stationed at Fort Sam Houston where training for this MOS took place."

- Eighteen men who managed to get a change in their assignment felt that it was completely due to their own efforts. For example, one master's degree agronomist writes that

> "After finishing basic training at Fort Knox, Kentucky, I was sent to Fort Polk, Louisiana for 11B AIT. While processing in for 11B training I was reassigned to on-the-job training as 70B (general clerk) in the mail and distribution center at Fort Polk. Later I sent a resume to Ms. Hardy in the Special Assignments Division of the U.S. Army at Washington, D. C. stating my qualifications for a job in agronomy. I had also written to Fort Detrick and found that they could use my qualifications in the Vegetation Control Project. About a week after writing to Washington, D. C., I got the assignment at Fort Detrick."

Thirteen men got a change in assignment which they knew to be directly attributable to the intervention of the Scientific Manpower Commission. Twenty-two reported a change but did not know whether our efforts or theirs brought it about. Two noted that a change was brought about through their Congressman, and five got an assignment changed as a result of injury or illness. However, 12 noted that they had attempted unsuccessfully one or more times to get a change in assignment and one said that someone in the military had made an effort to shift his assignment but had failed.

Help from the Scientific Manpower Commission

In terms of "public relations" the Scientific Manpower Commission apparently did a poor job in letting the men it was trying to help know exactly what it did and the circumstances in which it operated. For example, 41 people noted that the Scientific Manpower Commission had been a great help to them, but that during their time in the service, they never found anybody else who had ever heard of the organization. Fifteen men noted that the information supplied in advance by the Scientific Manpower Commission (that they should request the opportunity to fill out DA Form 1294, should take with them transcripts of their college work and resumes, etc.) was critical to their achieving the assignment they wanted to have. Seven others noted that SMC's efforts kept them in contact with the world which they found valuable, particularly during the uncertainties of basic training. A few of them noted with some bitterness that they had submitted the original forms to SMC but had never heard from us again until the final survey questionnaire arrived. Many of them did not understand that SMC had no authority to make or change assignments (although SMC's printed information sent to them indicated this), and that in every case the information was forwarded to the Pentagon for whatever action they might wish to take. Three said flatly that the Scientific Manpower Commission was a waste of money (each had unsuccessfully tried to change an assignment from 11B to something more in line with his civilian skills) and obviously none of them knew that this effort by the Scientific Manpower Commission involving more than 3,000 man-hours during the four year project had not been supported in any way by any outside source.

The files from this project indicate that in some cases, as many as 30 letters were exchanged with a single individual from the time of his first inquiry through the return of his final questionnaire. Additionally, in such cases a number of phone calls were made to the Pentagon, sometimes resulting in a change in assignment that increased the usefulness of the individual to the military. In many other cases, the only information exchanged were sets of form letters and forms.

A number of men noted that the classification interview was an important factor in their later assignment, and that the help SMC had supplied in preparing them for this interview was valuable. However, many of them also said that the particular interviewer was the key, and where his knowledge of technical fields was lacking this was a major handicap in seeking an appropriate assignment. Some noted that the interviewer tried to be helpful, despite lack of knowledge. For example, a physicist with a year of graduate study was assigned as a physical therapist on the recommendation of the interviewer, who thought from the similarity of the words that the utilization match was a good one. This assignment never got changed, despite considerable trying.

Science and Engineering Aide Program

Among the 621 men for whom final questionnaire forms were received, 254 were assigned to a MOS of 01 in the Science and Engineering Aide Program. A few others, usually with a MOS in the 92 series (Laboratory assistant), worked alongside the scientists and engineers with the appropriate 01 MOS in various Army research laboratories. Among the men assigned an 01 slots, 54% had completed a master's degree, a doctorate or two years of graduate study toward the doctorate; 18% had completed one year of graduate school and 28% held only the bachelor's degree. Almost all of this latter group were engineers.

Looked at another way, 63.6% of those in this sample with a master's or at least two years of graduate study, 29.6% of those who had completed one year of graduate study, and 29% of those with only a bachelor's degree were placed in this program.

Comments indicating individual reactions to their jobs by men assigned to the S & E Program ranged from very poor to excellent. Reactions appeared to be significantly related to the laboratory in which the man worked. There were no negative comments at all from the nine men who identified their station as Edgewood Arsenal, and all nine said the program there was outstanding. Among those identified as being at Walter Reed, opinion was equally divided with four feeling the program was an excellent one and four giving only negative comments. However, these eight men were not in the same laboratory.

One hundred eighty of the S & E Aides offered suggestions for improving the program. Fifteen felt that while the concept of the S & E Program was good, the administration of the program where they were was poor in that an exorbitant amount of time of the S & E aides was taken up by special assignments such as KP. Four of them said that the laboratory work being carried out was wasteful and at less than a professional level while 36 noted that the Science and Engineering aide can not function in a completely effective way because of his enlisted status. A common suggestion was that the aides should be ranked as warrant officers. Two men noted that this problem was overcome by a particular supervisor who treated and utilized enlisted aides as scientific professionals.

Getting into the Science and Engineering Aide Program was a function of three things - the availability of an open slot at the time a particular inductee completed his basic training; a knowledge of the program by the qualified inductee so that he could indicate his interest and supply necessary information for consideration; and an interviewer who followed through. One man noted that the S & E aides in his laboratory all seemed to represent smaller schools and wondered if perhaps the larger state universities did not inform their students who were about to be drafted of the existence of the program or the help that might have been available through the Scientific Manpower Commission.

Some of the comments:

- "Government connected research labs carry on work of a much lower level than they are capable of. Civilian employees (division chiefs on down) are too conservative to accept the ideas and suggestions of young college people, especially those in uniform." (*A master's degree geologist*).

- "S & E's are treated differently on all bases. Where I was stationed, we had project engineer responsibilities but other S & E's I talked to said they had no titles and were used mainly as coffee carriers while still others were somewhere in between. Perhaps the biggest drawback is in the system itself. It is very difficult to have a rank of private E2 and be a project engineer when you are in charge of several NCO's. There is bound to be some sort of conflict. Still, the program is a vast improvement over the method of no utilization of specific skills at all. The Army could use every college graduate in the field of science and engineering that enters the service, for when these people aren't used the Army hires comparable civilians at grades GS-9 to GS-11." (*A civil engineer, bachelor's level*).

- "The S & E program is an excellent idea but would be vastly more successful if S & E's were officers. Both civilian and enlisted military have a tendency to look down and belittle efforts by low ranking military personnel regardless of their previous training. I believe Civil Service would be able to attract many more S & E's after service if they didn't have to put up with so much petty harassment as enlisted men." (*A mechanical engineer with one year of graduate study stationed at White Sands Missile Range, New Mexico*).

- "The S & E program is extremely worthwhile but I would recommend an effort to try and place personnel more accurately in their primary field. This would boost morale and likewise boost productivity." (*Master's degree in medical microbiology used as biological assistant*).

This latter kind of comment came much more frequently from men with at least two years of graduate education (who were more specialized within their field) than from those at the bachelor's or bachelor's plus one year level. A chemist with a master's degree notes that

- "I was only able to use my primary field of training through my own efforts in pressuring my supervisor to do so. Enlisted personnel are often treated as automatons or idiots by career officers and this treatment can be most irritating

when the enlisted man has more education or knowledge in the field than the officer. Personnel with advanced degrees should enter the Army with at least E6 rank and be promoted from there much as M.D.'s enter as captains or majors. They should also receive some form of pro-pay since my experience indicates that in pre-service government employment I was earning about $12,000 while last year my income was only $3,000."

- A bachelor's degree electrical engineer stationed at White Sands said that he enjoyed his work but that his biggest complaint was the living conditions.

"There isn't enough storage room for a person to keep his belongings. S & E's stayed for 22 months at the Missile Range and living was very uncomfortable with no one allowed to live off post legally."

- A bachelor's degree mechanical engineer suggested that

"The S & E program should be continued and improved by giving the enlisted men more project responsibility and project assignments. Few S & E's were given enough projects or challenge since the Army and civil servants gave the S & E's only that portion of the project that required little or no technical background. We did the legwork to keep the overhead down."

- A master's degree microbiologist reports that

"I consider myself one of the luckiest draftees I knew in the Army. My duty station was the dental microbiology section of Letterman Army Institute of Research in San Francisco. In my experience in basic training and AIT (I was sent to artillery school, almost Vietnam by mistake) I met quite a few people with advanced scientific degrees. However, my CO in San Francisco had no luck in ever finding any. His requests for scientifically trained people under the 01H program were invariably filled with conscientious objectors, history majors and OCS washouts."

- A bachelor's degree biologist (fisheries) reports that

"The 01H slot at the Army Audiology and Speech Center at Walter Reed Medical Center has not been updated in a long time. Much of my time has truly been wasted. There is no need for an 01H MOS in the bioacoustics section, so my main chores for the past year have been janitorial work, secretarial work, and general building and laboratory maintenance."

- A master's degree mathematician says that

> "The S & E program suffers from haphazard duty assignment, e.g., since my specialty is mathematics I was assigned to a chemistry lab from which I was shortly traded for an M.S. in chemistry working in a supposed mathematics slot. Many of the S & E jobs require only a general scientific education - ME's, EE's and mathematicians often have the same jobs."

- Another master's degree mathematician says there are a number of S & E's in his unit but that most of the people in the organization are civilians.

> "The supervisors and division chiefs do not seem to have the same confidence in the S & E's as in the civilians, perhaps because the S & E's are military and in most cases have no career interest in the job. Most S & E's are extremely well qualified and have done very good work here."

- Expressions of gratitude at the existence of the S & E program and the opportunity to have served in it were numerous. A master's degree biochemist who served at Fort Detrick echoed the comments of many of these men when he said

> "The feeling of having spent my time on active duty in being genuinely useful and as an asset to the people for whom I work cannot be adequately expressed or evaluated."

- The opposite side of the coin is typified by this comment from a master's degree aeronautical engineer who says

> "The Army has no use for engineers as such in the enlisted (i.e. drafted) ranks, from my experience. The work I have done has called (occasionally) for some modicum of intelligence or aptitude for operating moderately complex pieces of equipment, but the use of post-graduate engineers is akin to using a sledge hammer as a fly swatter. The 'work' I do requires wrench and screwdriver rather than slide rule; and a strong back more often than a strong mind. I am under-utilized and very bored. No one would choose our positions if he had the alternative of a civilian job. While I appreciate your efforts on my behalf and appreciate my present position as an alternative to combat, if the Army thinks it needs engineers in uniform, then the Army is fooling itself. There are no good jobs to be placed in - only lesser evils."

- A master's degree microbiologist from Johns Hopkins who had been carrying out classified work on U-235 at Oak Ridge at the time he was drafted sums up his not atypical problems as a Science and Engineering Aide.

"My position as a biological assistant in the Army has been quite awkward. Although grateful to be out of combat, I have found that my assignment to a research institute has been something of a farce. My talents have hardly been used, my advice rarely heeded, and my time might have been wasted had I not discovered the library and its never-ending issues of technical journals to be read. I have concluded that the Army is no place to conduct analytical research, and certainly no place for dedicated professional scientists. Further, the use of highly trained individuals as technicians for 'waiting-for-retirement' officers, while better than their use as cannon fodder, is still a terrible waste of manpower.

You should continue to help draftees find suitable jobs in the Army but do not be fooled into thinking that an individual with a PMOS of 01H will be doing research for the Army. Most likely he is either carrying out busy work for the officers, reading for his own improvement, on an extended coffee break, or secretly conducting his own private research. This is what I have seen and done in my 18 months at U.S. AIDR. Not one paper has resulted from the work I did there, and it is frightening to think that anyone would ever try to publish the results obtained from two years of never-completed experiments.

The primary purpose of the U.S. Army is the defense of this country. Proper use of military manpower requires that only those individuals best suited for a combat mission be hired by the armed forces. All other activities advocated by the DoD should be carried out on a contract basis by civilians, with Congress empowered to scrutinize these contracts and to terminate them if necessary. Above all else, please get this point to those in a position to correct the incredible waste of manpower and the notorious inefficiency now rampant in the U.S. Army."

The quality of the research work done in the various Army laboratories was variously evaluated by a number of the men. The poor quality of the work was emphasized by at least two people at Aberdeen, Walter Reed, Fort Knox Medical Research Laboratory, Fort Detrick, and especially at the Arctic Test Center where not a single comment on the program was favorable. The high quality of research was emphasized by two or more people at Fort Benjamin Harrison, Fitzsimmons Army Hospital, Letterman Army Hospital, Walter Reed, the NATICK Labs., Fort Rucker Aerospace Research, and at Edgewood Arsenal where all comments that could be identified with a particular laboratory were favorable. Men in this program were stationed at at least 26 laboratories, but many did not identify their S & E station.

Where problems occurred, they were sometimes related to the quality of the research but more often to the problems of being a low ranking enlisted man trying to serve in a military setting as a professional scientist. The relationship between the officers and the enlisted men in the laboratories was not always good, and sometimes the relationship with the civilian scientists in the laboratory created problems because of the military enlisted status. At some laboratories, where the S & E personnel were among the relatively few permanent-duty station men, they drew inordinate amounts of special detail (two or more times per week), generally KP or honor guard for visiting VIP's, and thus were continously interrupted in their scientific work.

Those men originally assigned to AIT in some other area, particularly those assigned for training in the combat arms, were much more likely to "count their blessings" because of their ultimate S & E assignments than were some of those assigned from the beginning to S & E slots. One's idea of "a good assignment" was relative to the alternatives as he saw them.

The more education each man had, the more likely he was to find the work of low caliber and/or unchallenging, at least in terms of his own involvement in it.

The S & E program was originally conceived as a way of utilizing some of the highly trained scientists and engineers who entered the Army as enlisted men. Because of changes in the draft law and regulations, a disproportionate number of trained scientists and engineers entered the Army as draftees in the period from 1968 through 1971. The S & E program was much too small to utilize more than a fraction of those inducted.

If the draft is reinstated at some time in the future, and if it continues under its present rules, trained scientists and engineers are unlikely to be drafted at that stage of their lives. If men required to serve are liable for induction only during their 20th year, the interruption in their lives will occur prior to completion of their bachelor's degree. However, in case of a larger mobilization that would induct men without prior service from the second or third or later priority selection groups, the Army might once again find itself in a position of accepting enlisted inductees with one or more college degrees. In this case, the S & E program for enlisted men certainly should be activated, but some changes should be seriously contemplated.

SUMMARY AND CONCLUSIONS

- The Department of Defense had little need for scientists and engineers in the enlisted ranks during the Vietnam period. However, because of draft regulations, it acquired more than 32,000 in 1969 alone, in-

cluding 17,565 with degrees in the physical and biological sciences, mathematics and engineering and 14,655 in the social sciences. A substantial number of these men had completed at least one year of graduate study and many had advanced degrees.

- In part because of conflicting goals regarding the utilization of draftees and in part because the Army had little need for the level of training represented by these graduate scientists and engineers, at least in the enlisted ranks, utilization of each man in a technical specialty related to his civilian skills could not have been possible. Nonetheless, the Army failed all too often to fit the round pegs it acquired through the draft into the round holes it had, thus spending money and time to train men for new specialties when they already were well trained in specialties that the Army needed, and additionally often wasting the training it gave by not utilizing the men in the areas of their military schooling. Among those in the SMC sample who were given Advanced Individual Training by the Army, 42% were not utilized in the specialty for which they were trained.

- A much larger proportion of the men who requested help from the Scientific Manpower Commission was assigned to military occupation specialties that utilized their civilian skills than the proportion among all science and engineering graduates who entered the Army as enlisted men in 1969. However, this may be principally a reflection of their advanced graduate status, since 60% of the SMC sample had completed at least one year of graduate training.

- The Army's system for utilizing college graduates who are enlisted men and its treatment of enlisted men in general is seen by substantial numbers of enlisted college graduates as discouraging creativity, stifling ambition and destroying initiative. A substantial majority of the college graduates in this study saw their military experience as less useful, both to themselves and to the nation, than it might have been.

- The Science and Engineering Aide Program was a valuable way of utilizing the services of some of the well trained scientists and engineers who were supplied by the draft. The program was not totally effective, (1) because of the stringent class system that separates officers from enlisted men and (2) because the programs of some of the research laboratories were inadequate. By and large, however, the men who served in S & E slots felt they had contributed both to their country and to their own development during their military service.

- Military service for these scientists and engineers represented an interruption in an educational plan that continued to be pursued following military service and 50% of those with bachelor's degrees, 79% of those who had completed one year of graduate training and 65% of those with an advanced degree or at least two years of graduate education planned to return to school immediately after leaving the service. Within disciplines, there was considerable variation.

• An insignificant number of men in this sample received training in the military service that they planned to utilize later as civilians; and military service was not attractive enough to retain men from this group of college graduates after the required period of service was completed.

• Because so many of these men who were forced to interrupt their educational programs for military service did not utilize their civilian skills, a common thread of frustration runs through their comments indicating that two years out of their fields or on the periphery of their profession both let their skills grow stagnant and left them behind in an area where technological knowledge changes rapidly.

• Among the 620 men reporting on the final questionnaire, 11 reported injuries sufficiently serious to require hospitalization and to leave residual disability. Eight of these injuries occurred in basic training and two resulted in discharge. Six of the eight reported the injury to be stress fractures in the hips or knees. Additionally, one of the men in the original study was killed, one lost a kidney and another a leg as a result of combat. Thus, in this sample, twice as many men were seriously injured in basic training as were injured or killed in combat.

In answer to the question of whether the individual had been injured in service, one man summed up the attitude of a number of draftees when he asked, "Does mental retardation count"?

• Despite recommendations following World War II to plan ahead for effective mobilization, allocation and utilization of the nation's scientific manpower resources, no such plans were made or carried out and there appears to have been less utilization of the civilian-acquired skills of scientists in uniform during the Vietnam period than during World War II.

Implications for the All Volunteer Force

Achieving DoD's objective of an all-volunteer force in peace time is dependent upon a number of factors. One of them certainly is the view of the Army held by young men in their late teens and early twenties. This view is colored by contact with men who already have served in the military as they pass on their impressions of military life, opportunities and activities. Many people who have studied the question believe that a sufficient number of enlistments can be generated to fill the ranks, provided military pay is generally commensurate with earnings outside the military. Military pay already has achieved and perhaps exceeded parity for unskilled, non-high school graduates. However, to attract a sufficient number of those young men needed in a technological age who are of top mental caliber may not be possible without the draft unless some changes are brought about or are seen by young men as having been brought about to provide challenging, interesting opportunities for

personal and professional growth.

Opportunities to enter the service at advanced rank for persons already professionally trained, a variation in required enlistment periods for persons who do not need further specialized training by the military, and/or opportunities for advanced training in areas of already acquired specialties might be helpful in increasing enlistments of able young men. Further, the numbers of men and women needed by the military services and particularly the Army in specialities other than combat arms could be greatly reduced if the military took advantage of the pool of trained manpower already existing in society by allowing enlistment for particular specialties at appropriate entering rank and for varying periods of time.

Spreading the risks of injury or death in military service across all groups is a laudable objective. Further, good mental capacity is needed for service in combat specialties since lives depend upon the reactions of each man in a combat situation. Equally important to the nation is the husbanding of resources, including manpower, utilizing each individual in the place where he can be most valuable to the service and to his country. Veterans leaving the service at the end of their duty tour who feel that they have truly contributed to their country in a meaningful way serve as public relations specialists for the recruitment of others at no cost to the military budget and with more effectiveness than can be accomplished by most other recruitment efforts.

RECOMMENDATIONS

College graduates should generally not enter the service as enlisted men. Warrant officer rank might be particularly appropriate for scientists and engineers working in military laboratories.

If trained scientists and engineers are ever again required to enter the service involuntarily as enlisted men or women, the Science and Engineering Aide Program should be reactivated, and each laboratory reevaluated in terms of its manpower needs. Serious consideration should be given to the problems created by rank where men with equivalent or better scientific preparation than their ranking superiors are working on military research.

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APPENDIX A-1

NAME _____ Primary MOS _____

Social Security No. _____ Secondary MOS _____

Military Address _____

_____

_____

Date of Induction _____ Place _____. Date Basic Training Begins _____

Permanent Home Address _____

Home Phone _____

Degrees ____ in _____ School _____ Minor _____ GPA _____

____ in _____ School _____ Minor _____ GPA _____

Other Grad Work _____

Honors? _____

Special Academic Concentration areas _____

_____

_____

Computers? ____ Which languages? _____

Job Experience (include summers) _____

_____

Any Teaching? _____

Foreign Language proficiency? _____

Helpful hobbies? _____ Physical Handicaps? _____

Instructions: (Clip off and retain before returning top portion of page to SMC)

1. Before induction, prepare a resume of education and experience. Obtain copies of all your transcripts. Make 3 copies of each, taking two with you when you report for induction and mailing one to the Scientific Manpower Commission.

2. Tell interviewer at the Reception Station all background and experience you wish to have considered. (Resume will help you provide complete information). Scientists and Engineers should express interest in the Science and Engineering Aide Program. Ask to fill out DA Form 1294. If allowed to do so, attach copy of resume and transcripts.

3. Contact us at once as soon as your basic training address is known, giving us the address and the date that your basic training class begins. WE CANNOT LOOK FOR APPROPRIATE OPENINGS UNTIL THIS INFORMATION IS RECEIVED. We suggest you take a pre-addressed postcard with you so you will lose no time.

4. Notify us immediately when your Military Occupation Specialty (MOS) is assigned; and let us know whether a secondary MOS has been assigned. Tell us where you are ordered to report following basic training.

SCIENTIFIC MANPOWER COMMISSION, 2101 Constitution Ave., N.W., Washington, D.C. 20418
Phone: 202-223-6995 or 202-961-1550

APPENDIX A-2

CLASSIFICATION AND UTILIZATION OF SCIENTISTS AND ENGINEERS INDUCTED INTO THE ARMY

One of the foremost problems confronting young men today is their status with respect to the draft. Young men who possess college degrees and may have started careers in their chosen field possess a wealth of knowledge and experience the Army can utilize. This is particularly true for those young men in scientific and engineering fields. Although the Army has no control over the academic qualifications of the personnel inducted, it does recognize the vast potential in these people and its responsibility to make the best possible utilization of those persons inducted.

The Scientific and Engineering Assistants Program was established in order to provide for the identification, selection and utilization of personnel with academic backgrounds, training and experience in scientific and engineering specialties which are directly usable by the Army in research, development, testing, and similar lines of Army technological work, consistent with the Army's needs for such personnel. The following military occupational specialties are included in the enlisted Scientific and Engineering Assistants Program:

Electrical-Electronic Engineering Assistant
Mechanical Engineering Assistant
Civil Engineering Assistant
Mathematics-Statistics Assistant
Physical Sciences Assistant
Biological Sciences Assistant
Chemical Engineering Assistant

At the present time, there are approximately 1,370 positions identified within the Scientific and Engineering Program, with about half the positions opening each year.

Unfortunately, the number of openings is far exceeded at this time by the number of draftees qualified for the program. However, qualified scientists and engineers should fill out DA Form 1294 at the induction station.

The minimum requirement is a baccalaureate or higher degree in one of the following specialties: Agronomy, Anatomy, Astronomy, Bacteriology, Biochemistry, Biological Science, Biology (microbiology), Biophysics, Chemistry, Engineering (all fields), Entomology, Food Technology, Geology, Geophysics, Mathematics, Metallurgy, Meteorology (climatology), Nuclear Reactor Technology, Parasitology, Pharmacology, Physics, Physiology, and Statistics.

Personnel found qualified and for whom a position vacancy exists are issued assignment instructions at the end of basic training. When a requirement does not exist, or a person is not considered fully qualified, a recommendation is made to assign him within a related military specialty if possible. Records are retained on file for possible future utilization with the program. Examples of related military specialties might be the assignment of a chemistry major as a Chemical Laboratory Specialist or the assignment of a mathematics or physics major in the field of Automatic Data Processing.

APPENDIX A-3

SCIENTIFIC MANPOWER COMMISSION

2101 CONSTITUTION AVENUE, N.W. 202-223-6995
WASHINGTON, D. C. 20418 202-961-1550

Dear Sir:

You are one of about 1,000 men who contacted the Scientific Manpower Commission for help in getting an MOS that would utilize your civilian skills during your military service. Although we devoted a major portion of our time to this unsubsidized effort for two years, we do not know the final results. We are now trying to find out how effectively the Army used the civilian skills of this outstanding group of college graduate draftees, of which you were a member.

We would appreciate your filling out and returning this questionnaire, so that a statistical picture can be drawn, and meaningful recommendations can be made to the Department of Defense and to the Congress. The information requested is, of course, confidential, and will be used only in statistical compilations.

If you supplied us with original transcript(s) of your college work, and if they have not previously been returned to you, they are enclosed.

Sincerely,
Betty M. Vetter
Betty M. Vetter, Executive Director

Name_____Social Security Number_____

Permanent Home Address _____

Date Entered Service _____ Date (or expected date) of Discharge _____

Educational Level at time of Service Entry (Circle Highest)

1.Bachelor's 2.Bachelor's + 1 year grad study 3.Bachelor's + 2 years grad study
4. Master's 5. Ph.D.

Major Field of Highest Degree_____Minor_____

Primary MOS_____ No. of months of duty in this MOS_____

Secondary MOS_____ No. of months of duty in this MOS_____

Duty MOS (if different from above)_____ No. of months duty in this MOS_____

(over)

Highest Military Rank achieved in Service _____

Using the following definitions, please circle the category number that best describes the utilization of your civilian skills in military service:

1. Utilized in primary field and at proper level of competence (training and experience) throughout most of military service.
2. Utilized in primary field and at proper level of competence at least half the time.
3. Utilized in primary field, but at lower level of competence most of the time.
4. Utilized in primary field, but at lower level of competence at least half the time.
5. Not utilized in primary field, but did utilize collateral fields of training most of the time.
6. Utilized in primary field or in collateral fields of training for short period of time.
7. Utilized neither in primary field nor any of collateral fields while in service.

Were you injured in military service? ____ If so, what is the extent of permanent disability?_____

What are you doing (or do you plan to do) after completing active duty tour? (Please Circle appropriate number)

1. Attend graduate school - same major field as before military service.
2. Attend graduate school - different major field (please name)_____
3. Return to pre-service employment.
4. Find employment in a job related to my college major.
5. Find employment in a job related to my military training (if different than 4)
6. Remain in military service.
7. Hospitalization and/or rehabilitation program.
8. Remain unemployed (6 months or more)
9. Other _____

Was the information or assistance given to you by the Scientific Manpower Commission of help to you in obtaining your military assignment(s)?

Yes_____ No_____ Don't know_____

We would appreciate your comments below. Thank you for your help. A pre-addressed envelope is enclosed to return the questionnaire.

Table A

COMPARISON OF SAMPLE ON WHOM ALL INFORMATION IS KNOWN WITH GROUP WHERE ONLY FIRST MILITARY OCCUPATION SPECIALTY IS KNOWN

		SAMPLE I ALL INFORMATION KNOWN				SAMPLE II ONLY FIRST MOS KNOWN				COMBINED SAMPLE (I AND II)			
		TOTAL	BACH.	BACH. + 1 YR	BACH. +2YR /MAS/DOC	TOTAL	BACH.	BACH. + 1 YR	BACH. +2YR /MAS/DOC	TOTAL	BACH.	BACH. + 1 YR	BACH. +2YR /MAS/DOC
PHYSICS	No	47	12	20	15	14	6	5	3	61	18	25	18
	%	7.7	25.5	42.5	31.9	6.8	42.8	35.7	21.4	7.4	29.5	41.0	29.5
CHEMISTRY	No	85	22	22	41	35	12	12	11	120	34	34	52
	%	13.8	25.8	25.8	48.2	17.0	34.3	34.3	31.4	14.6	28.3	28.3	43.3
MATH/STAT/ COMPUTER SCI	No	54	20	16	18	10	5	2	3	64	25	18	21
	%	8.8	37.0	29.6	33.3	4.9	50	20	30	7.8	39.1	28.1	32.8
GEOSCIENCES	No	17	3	4	10	10	4	3	3	27	7	7	13
	%	2.8	17.6	23.5	58.8	4.9	40	30	30	3.3	25.9	25.9	48.1
ALL PHYSICAL SCIENCES	No	213	59	66	88	69	27	22	20	282	86	88	108
	%	34.7	27.7	31.0	41.3	33.5	39.1	31.9	29.0	34.3	30.5	31.2	38.3
BIOLOGICAL SCIENCES	No	106	27	23	56	34	12	5	17	140	39	28	73
	%	17.3	25	21.7	52.8	16.5	34.3	14.3	48.6	17.1	27.8	20.0	52.1
CHEMICAL ENGINEERING	No	27	18	3	6	12	9	2	1	39	27	5	7
	%	4.4	66.6	11.0	22	5.8	75	16.7	8.3	4.8	69.2	12.8	17.9
ELECTRICAL ENGINEERING	No	51	35	9	7	16	9	4	3	67	44	13	9
	%	8.3	68.5	17.6	13.7	7.8	56.2	25	18.8	8.2	65.7	19.4	14.9
MECHANICAL ENGINEERING	No	50	34	7	9	12	10	1	1	62	44	8	10
	%	8.1	68	14	18	5.8	83.3	8.3	8.3	7.6	71.0	12.9	16
ALL ENGINEERING	No	194	129	30	35	59	41	10	8	253	170	40	43
	%	31.6	66.5	15.5	18	28.6	69.5	16.9	13.5	30.8	67.2	15.8	17.0
PSYCHOLOGY	No	23	2	11	10	11	2	1	8	34	4	12	18
	%	3.7	8.7	47.8	43.4	5.3	18.2	9.1	72.8	4.1	11.8	35.3	52.9
OTHER SOCIAL SCIENCES	No	38	12	11	15	24	10	6	8	62	22	17	23
	%	6.2	31.6	28.9	39.5	11.6	41.6	25	33.3	7.6	35.5	27.4	37.1
ALL OTHER	No	40	16	11	13	9	7		2	50	24	11	15
	%	6.5	37.5	27.5	32.5	4.4	77.8		22.2	6.1	48	22	30
TOTAL	No	614	245	152	217	206	99	44	63	821	345	196	280
	%	100	39.9	24.8	35.3	100	48.1	21.3	30.6	100	42.0	23.9	34.1

Table B

UTILIZATION OF CIVILIAN SKILLS IN FIRST MILITARY OCCUPATION SPECIALTY BY FIELD AND DEGREE LEVEL

			BACHELORS					BACHELORS + 1 YR					BACHELORS + 2 YR/MAS/DOC				
		GRAND TOTAL	TOTL	UTIL CIVL SPEC	COL UTIL N-CM	NOT UTIL N-CM	NOT UTIL CMBT	TOTL	UTIL CIVL SPEC	COL UTIL N-CM	NOT UTIL N-CM	NOT UTIL CMBT	TOTL	UTIL CIVL SPEC	COL UTIL N-CM	NOT UTIL N-CM	NOT UTIL CMBT
PHYSICS	No	61	18	2	3	5	8	25	8	7	8	2	18	12	4	1	1
	%	21.6	29.5	11.1	16.6	27.7	44.4	41.0	32	28	32	8	29.5	66.6	22.2	5.5	5.5
CHEMISTRY	No	120	34	11	3	8	12	34	9	3	12	10	52	32	1	11	8
	%	42.6	28.3	32.3	8.8	23.5	35.3	28.3	26.5	8.8	35.3	29.4	43.3	61.5	1.9	21.2	15.4
MATH/STAT/ COMPUTER SCI	No	64	25	4	4	6	11	18	6	1	5	6	21	20		1	
	%	22.7	39.1	16	16	24	44	28.1	33.3	5.5	27.7	33.3	32.8	95.2		4.8	
GEOSCIENCES	No	27	7	1	2	3	1	7			2	5	13	5		4	4
	%	9.6	25.9	14.2	28.6	42.8	14.2	25.9			28.6	71.4	48.1	38.5		30.7	30.7
ALL PHYSICAL SCIENCES	No	282	86	18	13	21	33	88	23	12	30	23	108	70	7	17	14
	%	100	30.5	20.9	15.1	24.4	38.4	31.2	26.1	13.6	34.1	26.1	38.3	64.8	6.5	15.7	13.0
BIOLOGICAL SCIENCES	No	140	39	10	8	8	13	28	7	1	8	11	73	40	9	11	13
	%		27.8	25.6	20.5	20.5	33.3	20.0	25.0	3.6	28.6	39.3	52.1	54.8	12.3	15.1	17.8
CHEMICAL ENGINEERING	No	39	27	8	1	11	7	5	1		1	3	7	6		1	
	%	15.4	69.2	29.6	3.7	40.7	25.9	12.8	20		20	60	17.9	85.7		14.3	
ELECTRICAL ENGINEERING	No	67	44	20	10	6	8	13	9	2	1	1	10	9			1
	%	26.5	65.7	45.5	22.7	13.6	18.2	19.4	69.2	15.4	7.7	7.7	14.9	90			10
MECHANICAL ENGINEERING	No	62	44	23	8	4	9	8	4	1	1	2	10	7		1	2
	%	24.5	71.0	52.3	18.2	9.1	20.5	12.9	50	12.5	12.5	25	16	70		10	20
ALL ENGINEERING	No	253	170	64	27	37	42	40	17	5	5	13	43	31	3	5	4
	%		67.2	37.6	15.9	21.8	24.7	15.8	42.5	12.5	12.5	32.5	17.0	72.1	7.0	11.6	9.3
PSYCHOLOGY	No	34	4	2	1	1		12	4	4	2	2	18	6	5	4	3
	%		11.8	50	25	25		35.3	33.3	33.3	16.6	16.6	52.9	33.3	27.8	22.2	16.7
OTHER SOCIAL SCIENCES	No	62	22	1	2	9	10	17	1	5	7	4	23	2	2	15	4
	%		35.5	4.5	9.1	40.1	45.5	27.4	5.9	29.4	41.2	23.5	37.1	8.7	8.7	65.2	17.4
ALL OTHER	No	50	24	6	3	5	10	11	4	2	3	2	15	6	2	4	3
	%		48	25	12.5	20.8	41.7	22	36.4	18.2	27.3	18.2	30	40	13.3	26.7	20
TOTAL	No	821	345	101	54	82	108	196	56	29	55	55	280	155	28	56	41
	%		42.0	29.3	15.7	23.8	31.3	23.9	28.6	14.8	28.1	28.1	34.1	55.4	18.1	20	14.6

1. Utilized civilian specialty
2. Utilized collateral skills (non-combat MOS)
3. Civilian skills not utilized (non-combat MOS)
4. Civilian skills not utilized (combat MOS)

Table C

UTILIZATION OF CIVILIAN SKILLS IN MAJOR MILITARY OCCUPATION SPECIALTY BY FIELD AND DEGREE LEVEL

		GRAND TOTAL	BACHELORS					BACHELORS + 1 YR					BACHELORS + 2 YR/MAS/DOC				
			TOTL	UTIL CIVL SPEC	COL UTIL N-CM	NOT UTIL N-CM	NOT UTIL CMBT	TOTL	UTIL CIVL SPEC	COL UTIL N-CM	NOT UTIL N-CM	NOT UTIL CMBT	TOTL	UTIL CIVL SPEC	COL UTIL N-CM	NOT UTIL N-CM	NOT UTIL CMBT
PHYSICS	No	47	12	2	4	5	1	20	8	5	6	1	15	12	2	1	
	%		25.5	16.6	33.3	41.7	8.3	42.6	40	25	30	5	31.9	80	13.3	6.7	
CHEMISTRY	No	85	22	6	3	7	6	22	7	4	8	3	41	31	3	6	1
	%		25.8	27.3	13.6	31.8	27.3	25.8	31.8	18.1	36.4	13.6	48.2	75.6	7.3	14.6	2.4
MATH/STAT/ COMPUTER SCI	No	54	20	3	3	9	5	16	6	3	6	1	18	17		1	
	%		37.0	15	15	45	25	29.6	37.5	18.7	37.5	6.25	33.3	94.4		5.6	
GEOSCIENCES	No	17	3			2	1	4			3	1	10	4		5	1
	%		17.6			66.7	33.3	23.5			75	25	58.8	40		50	10
ALL PHYSICAL SCIENCES	No	213	59	11	11	23	14	66	21	13	26	6	88	66	6	14	2
	%		27.7	18.6	18.6	39.0	23.7	31.0	31.8	19.7	39.4	9.1	41.3	75.0	6.8	15.9	2.3
BIOLOGICAL SCIENCES	No	106	27	14	5	5	3	23	9	1	9	4	56	37	8	9	2
	%		25	51.8	18.5	18.5	11.1	21.7	39.1	4.3	39.1	17.4	52.8	66.1	14.3	16.1	3.6
CHEMICAL ENGINEERING	No	27	18	5	2	9	2	3	1		1	1	6	5		1	
	%		66.6	27.7	11.1	50	11.1	11.0	33.3		33.3	33.3	22.0	83.3		16.6	
ELECTRICAL ENGINEERING	No	51	35	20	11	1	3	9	8	1			7	7			
	%		68.6	57.1	31.4	2.8	8.6	17.6	88.8	11.1			13.7	100			
MECHANICAL ENGINEERING	No	50	34	19	7	5	3	7	4	1	2		9	8		1	
	%		68	55.9	20.6	14.7	8.8	14	57.1	14.3	28.6		18	88.8		11.1	
ALL ENGINEERING	No	194	129	62	30	24	13	30	16	4	5	5	35	29	2	4	
	%		66.5	48.1	23.2	18.6	10.1	15.5	53.3	13.3	16.6	16.6	18.0	82.9	5.7	11.4	
PSYCHOLOGY	No	23	2	1	1			11	5	2	3	1	10	8	2		
	%		87	50	50			47.8	45.4	18.2	27.3	9.1	43.4	80	20		
OTHER SOCIAL SCIENCES	No	38	12	1	2	8	1	11	2	5	3	1	15	2	4	8	1
	%		31.6	8.3	16.6	66.7	31.6	28.9	18.2	45.2	27.11	9.1	39.5	13.3	26.6	53.3	6.7
ALL OTHER	No	40	16	6	2	4	4	11	4	4	2	1	13	5	4	4	
	%		40	37.5	12.5	25	25	27.5	36.4	36.4	18.2	9.1	32.5	38.5	30.8	30.8	
TOTAL	No	614	245	95	51	64	35	152	57	29	48	18	217	147	26	39	5
	%		39.9	38.7	20.8	26.1	14.3	24.75	37.5	19.1	31.6	11.8	35.3	67.7	12.0	18.0	2.3

Table D

UTILIZATION OF CIVILIAN SKILLS IN MAJOR MILITARY OCCUPATION SPECIALTY BY FIELD, DEGREE LEVEL, AND ACADEMIC HONORS

			BACHELORS						BACHELORS + 1 YR						BACHELORS + 2 YR/MAS/DOC					
		GRAND TOTAL	TOTAL HONORS	UTIL CIVL SPEC	SPEC NOT UTIL	TOTAL NO HONORS	UTIL CIVL SPEC	SPEC NOT UTIL	TOTAL HONORS	UTIL CIVL SPEC	SPEC NOT UTIL	TOTAL NO HONORS	UTIL CIVL SPEC	SPEC NOT UTIL	TOTAL HONORS	UTIL CIVL SPEC	SPEC NOT UTIL	TOTAL NO HONORS	UTIL CIVL SPEC	SPEC NOT UTIL
PHYSICS	No	42	7	2	5	3	1	2	14	9	5	6	3	3	12	11	1	2	1	1
	%		70	28.6	71.4	30	33.3	66.7	70	64.3	35.7	30	50	50	85.7	91.6	8.3	14.3	50	50
CHEMISTRY	No	82	10	4	6	12	4	8	17	7	10	5	4	1	30	26	4	8	6	2
	%		45.4	40	60	54.5	33.3	66.7	77.2	41.2	58.8	22.7	80	20	78.9	86.6	13.3	21	75	25
MATH/STAT/ COMPUTER SCI	No	50	12	2	10	6	2	4	9	6	3	5	1	4	15	14	1	3	3	
	%		66.7	16.6	83.3	33.3	33.3	66.7	64.3	66.7	33.3	35.7	20	80	83.3	93.3	6.7	16.6	100	
GEOSCIENCES	No	16	3		3				3		3	1		1	6	4	2	3		3
	%		100		100				75		100	25		100	66.7	33.3	33.3	33.3		100
ALL PHYSICAL SCIENCES	No	200	33	8	25	21	7	14	44	23	21	19	8	11	65	56	9	18	12	6
	%		61.1	24.2	75.8	38.8	33.3	66.7	70	52.3	47.7	30	42.1	57.9	78.3	86.1	13.8	21.7	66.7	33.3
BIOLOGICAL SCIENCES	No	96	7	4	3	16	10	6	9	4	5	13	6	7	37	29	8	14	13	1
	%		30.4	57.1	42.8	69.5	62.5	37.5	40.9	44.4	55.6	59.1	46.1	53.8	72.5	78.3	21.6	27.5	92.8	7.1
CHEMICAL ENGINEERING	No	26	6	1	5	11	5	6	3	1	2				6	5	1			
	%		35.3	16.6	83.3	64.7	45.5	54.5	100	33.3	66.7				100	83.3	16.6			
ELECTRICAL ENGINEERING	No	48	21	15	6	13	12	1	5	5		3	3		5	5		1	1	
	%		61.8	71.4	28.6	38.2	92.3	7.7	62.5	100		37.5	100		83.3	100		16.6	100	
MECHANICAL ENGINEERING	No	47	13	10	3	19	15	4	4	3	1	2	1	1	9	8	1			
	%		40.6	76.9	23.1	59.4	78.9	21.1	66.7	75	25	33.3	50	50	100	88.9	11.1			
ALL ENGINEERING	No	179	55	37	18	64	45	19	17	12	5	9	4	5	33	29	4	1	1	
	%		46.2	67.2	32.7	53.8	70.3	29.7	65.3	70.6	29.4	34.6	44.4	55.6	97.0	87.9	12.1	3	100	
PSYCHOLOGY	No	20	1	1		1	1		3	2	1	6	3	3	7	7		2	2	
	%		50	100		50	100		33.3	66.7	33.3	66.7	50	50	77.7	100		22.2	100	
OTHER SOCIAL SCIENCES	No	34	6	1	5	4	2	2	7	3	4	2	2		10	5	5	5	1	4
	%		60	16.6	83.3	440	50	50	77.7	42.8	57.1	22.2	100		66.7	50	50	33.3	20	80
ALL OTHER	No	37	4	1	3	11	7	4	5	4	1	6	4	2	8	5	3	3	3	
	%		26.6	25	75	73.3	63.6	36.3	45.4	80	20	54.5	66.7	33.3	72.7	62.5	37.5	27.3	100	
TOTAL	No	566	106	52	54	117	72	45	85	48	37	55	27	28	160	131	29	43	32	11
	%		47.5	49	51	52.5	61.5	38.5	60.7	56.5	43.5	39.3	49.1	50.1	78.8	81.9	18.1	21.1	74.4	25.6